Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

4753582642

PHYSICS **0625/53**

Paper 5 Practical Test **May/June 2014**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of the page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

For Examiner's Use	
1	
2	
3	
4	
Total	

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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

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[Turn over

1 In this experiment, you will determine the density of water using two methods.

(a) Method 1

Carry out the following instructions, referring to Figs. 1.1 and 1.2.

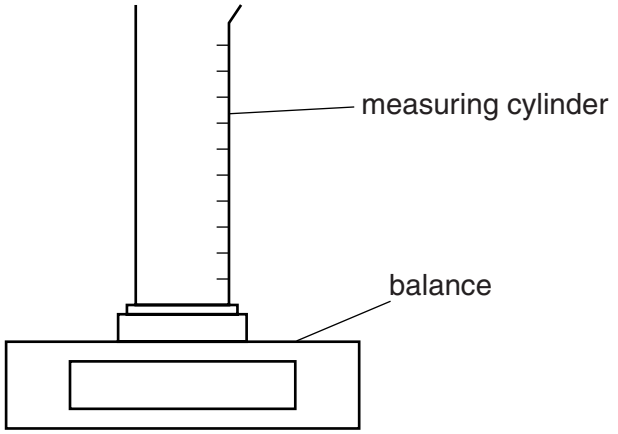

Fig. 1.1

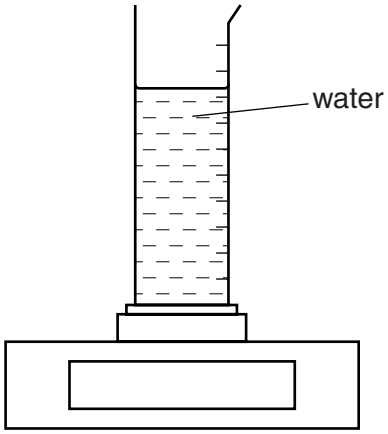

Fig. 1.2

(i) Place the empty measuring cylinder on the balance as shown in Fig. 1.1. Measure and record the mass m_1 of the empty measuring cylinder. Remove the measuring cylinder from the balance.

m_1 = ...g

(ii) Pour approximately 70 cm^3 of water into the measuring cylinder. Measure and record the volume V_1 of the water.

V_1 = ... cm^3

(iii) Place the measuring cylinder containing the water on the balance as shown in Fig. 1.2. Measure and record the mass m_2 of the measuring cylinder and water.

m_2 = ...g
[2]

Leave the water in the measuring cylinder for use in **Method 2**. Remove the measuring cylinder from the balance.

(iv) Calculate a value ρ_1 for the density of water using the equation $\rho_1 = \frac{m_2 - m_1}{V_1}$. Give an appropriate unit.

ρ_1 = ...[1]

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(b) Method 2

Carry out the following instructions, referring to Figs. 1.3 and 1.4.

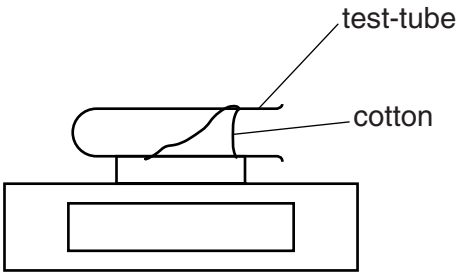

Fig. 1.3

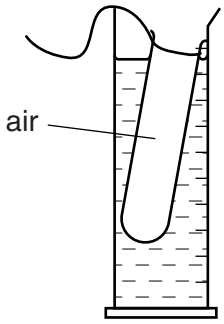

Fig. 1.4

(i) Place the empty test-tube on the balance as shown in Fig. 1.3. Measure and record the mass m_3 of the test-tube.

m_3 = ...g

(ii) Carefully lower the test-tube, by means of the cotton, into the measuring cylinder until it floats as shown in Fig. 1.4. Measure and record the new water level V_2 in the measuring cylinder.

V_2 = ... cm^3

(iii) Using your results from **(a)(ii)** and **(b)(ii)**, calculate V_3, the change in the water level, where $V_3 = (V_2 - V_1)$.

V_3 = ... cm^3
[2]

(iv) Calculate and record a value ρ_2 for the density of water using the equation $\rho_2 = \frac{m_3}{V_3}$.

ρ_2 = ...[1]

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(c) Calculate an average value ρ_{AV} for the density of water using your results from **(a)(iv)** and **(b)(iv)**.

ρ_{AV} = ...[1]

(d) Suggest a precaution that should be taken in **Method 1** to ensure that the volume reading is as accurate as possible. You may draw a diagram.

.....

.....

.....[1]

(e) Suggest a possible source of experimental inaccuracy in **Method 2**, other than with the volume reading.

State and explain the effect that this would have on your value for ρ_2.

suggestion .....

.....

effect and explanation.....

.....
[2]

[Total: 10]

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Turn over for Question 2

2 In this experiment, you will investigate the cooling of water.

Carry out the following instructions, referring to Fig. 2.1.
The thermometer must remain in the clamp throughout the experiment, at the same height.

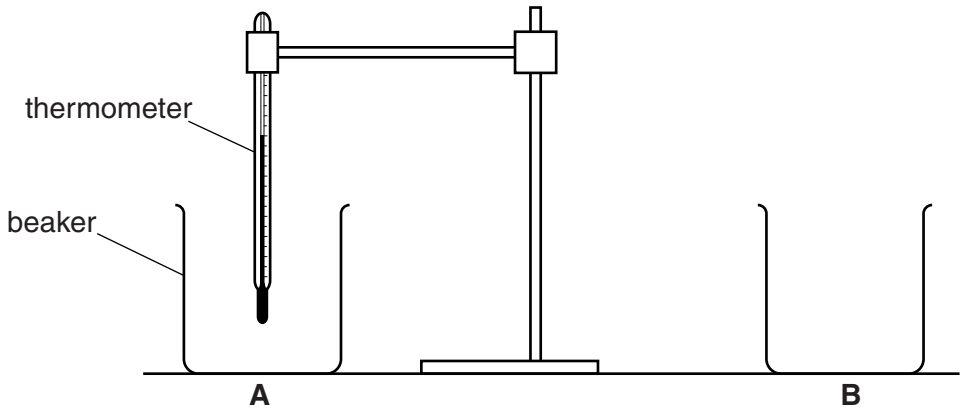

Fig. 2.1

(a) (i) Pour approximately 200 cm^3 of hot water into beaker **A**.

(ii) Wait for about 30 seconds before taking any measurements.

(iii) Start the stopclock and read the thermometer.
In the top row of Table 2.1, record this temperature θ at time $t = 0$.

(iv) In the table, record the temperature θ of the water at times $t = 30\,s$, 60 s, 90 s, 120 s,150 s and 180 s.

(v) Complete the column headings in the table.

(vi) Carefully remove the thermometer from beaker **A**.
Place the thermometer in beaker **B**.

Table 2.1

	beaker **A** with approximately 200 cm^3 of water	beaker **B** with approximately 100 cm^3 of water
t/	θ/	θ/

[5]

(b) **(i)** Pour approximately 100 cm^3 of hot water into beaker **B**.

(ii) Repeat **(a)(ii)** to **(iv)** for beaker **B**.

(c) Describe a similarity in the patterns of temperature change of the two volumes of water, apart from the fact that the temperature of each decreases.

.....

.....

.....[1]

(d) A student suggests that the rate of cooling is smaller for a larger volume of water than for a smaller volume of water.

State whether your readings support this suggestion. Justify your answer by referring to your readings.

statement.....

justification.....

.....

.....
[2]

(e) Another IGCSE student wants to repeat your experiment in order to check the results.

Suggest two factors that should be kept the same in order for the comparison to be fair.

1. .....

.....

2. .....

.....
[2]

[Total: 10]

3 In this experiment, you will investigate resistance using a set of wires.

The circuit in Fig. 3.1 has been set up for you.

Carry out the following instructions, referring to Fig. 3.1.

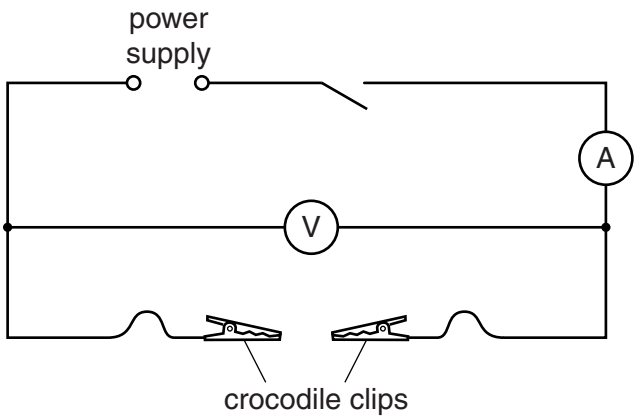

Fig. 3.1

(a) (i) Connect the crocodile clips to the ends of wire **A**.

(ii) Switch on. Measure, and record in Table 3.1, the potential difference V and the current I. Switch off.

Table 3.1

wire	V/	I/
A		
B		
C		

[3]

(b) (i) Disconnect wire **A** and connect the crocodile clips to the ends of wire **B**.

(ii) Repeat step **(a)(ii)**.

(c) (i) Disconnect wire **B** and connect the crocodile clips to the ends of wire **C**.

(ii) Repeat step **(a)(ii)**.

(d) Complete the column headings in the table.

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(e) **(i)** Calculate and record the resistance R of each wire, using your readings from the table and the equation $R = \frac{V}{I}$.

resistance of wire **A**, R_A = ...

resistance of wire **B**, R_B = ...

resistance of wire **C**, R_C = ...

[3]

(ii) A student suggests that R_A should be equal to $R_B + R_C$.

State whether your findings support this suggestion. Justify your answer by reference to your results.

statement .....

.....

justification .....

.....

.....

[1]

(f) One problem encountered in this type of investigation is that resistance can be affected by a rise in temperature of the wire.

Suggest one way in which this effect could be kept to a minimum.

.....

.....

.....[1]

(g) In a variation of this experiment, an IGCSE student wants to change the current in wire **A** using a variable resistor (rheostat).

(i) In the space below, draw the standard circuit symbol for a variable resistor.

(ii) On Fig. 3.1, mark with an **X** where the variable resistor could be connected so that it may be used in this way.

[2]

[Total: 10]

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[Turn over

4 In this experiment, you will investigate shadows.

Carry out the following instructions, referring to Fig. 4.1.

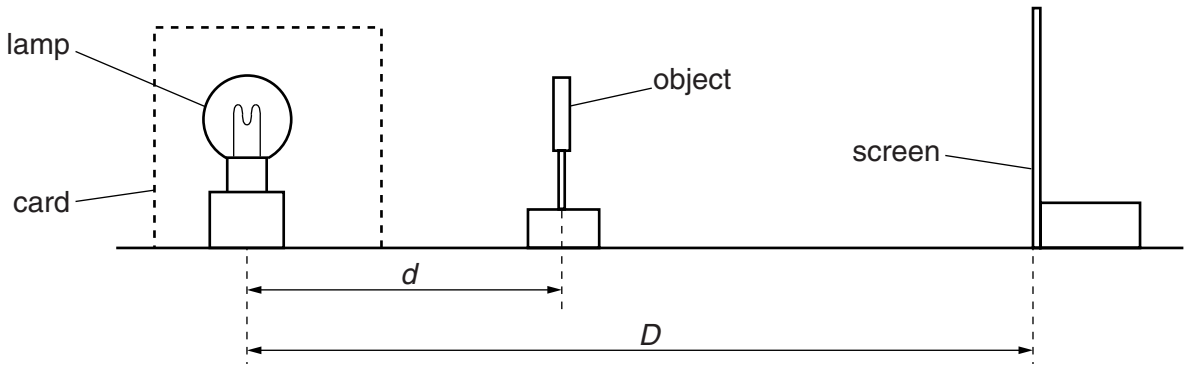

Fig. 4.1

The lamp, card and screen have been set up for you. The card is to protect your eyes from the glare of the lamp and should remain at the side of the lamp.

(a) (i) Set the distance *D* between the centre of the lamp and the screen to 60 cm.
Do not change this distance during the experiment.

(ii) Place the object at a distance $d = 55$ cm from the centre of the lamp so that it produces a shadow on the screen.

(iii) Measure, and record in Table 4.1, the width *w* and the height *h* of the shadow of the square object.

Table 4.1

d/cm	*w*/cm	*h*/cm	*s*/cm
55			
45			
35			
25			
20			
15			

[2]

(iv) Repeat **(a)(iii)** for *d* values of 45 cm, 35 cm, 25 cm, 20 cm and 15 cm.

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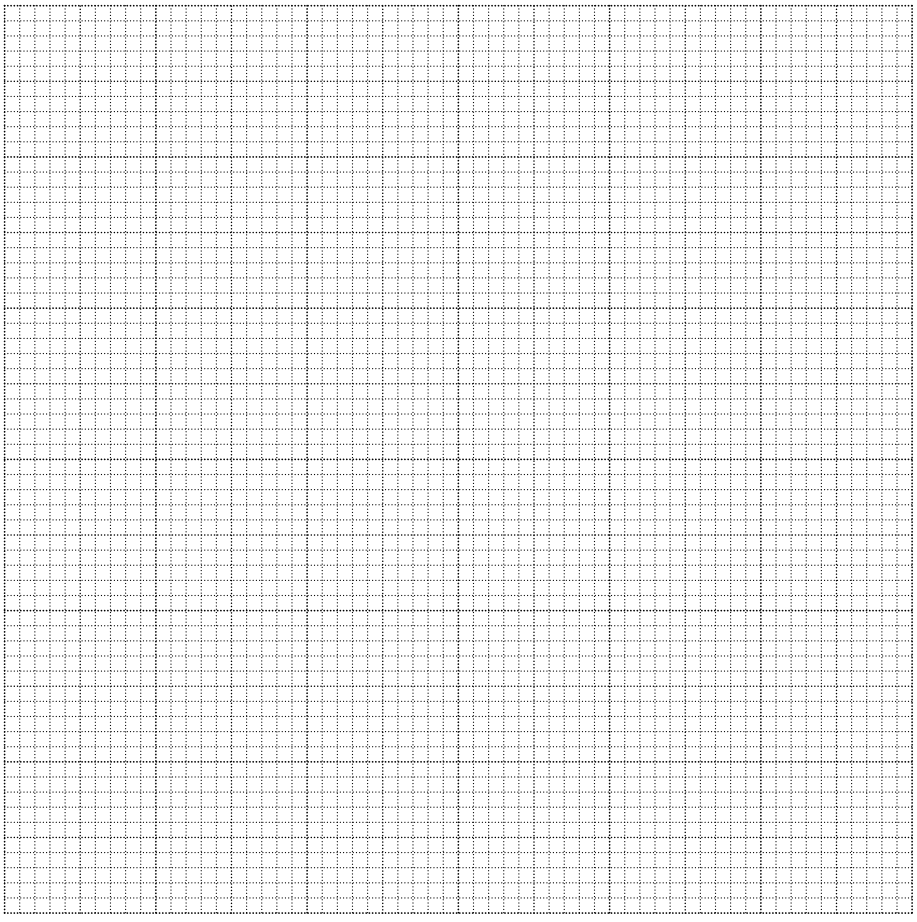
(b) (i) For each distance d, calculate, and record in the table, a value for the average side length s, using your readings for w and h and the equation $s = \frac{w + h}{2}$.

(ii) The object you are using is square in shape. State a practical reason why it is useful to calculate s rather than just rely on w or h to show the size of the shadow.

.....

.....[1]

(c) Plot a graph of s/cm (y-axis) against d/cm (x-axis).



[5]

(d) A value of d = 20 cm has been inserted between d = 25 cm and d = 15 cm. This does not follow the pattern of the gaps of 10 cm between the other distances.

Explain why it is useful to have this value when drawing the line on the graph.

.....

.....[1]

(e) A student suggests that the distance between the lamp and the object in this experiment should be no less than 15 cm.

From your observations, give a reason why this is a sensible suggestion.

.....

.....[1]

[Total: 10]

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