Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

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PHYSICS **0625/52**

Paper 5 Practical Test **February/March 2016**

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.
You are advised to spend about 20 minutes on each of questions 1 to 3, and 15 minutes on question 4.
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 **11** printed pages and **1** blank page.

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1 In this experiment, you will determine the density of glass.

Carry out the following instructions, referring to Fig. 1.1.

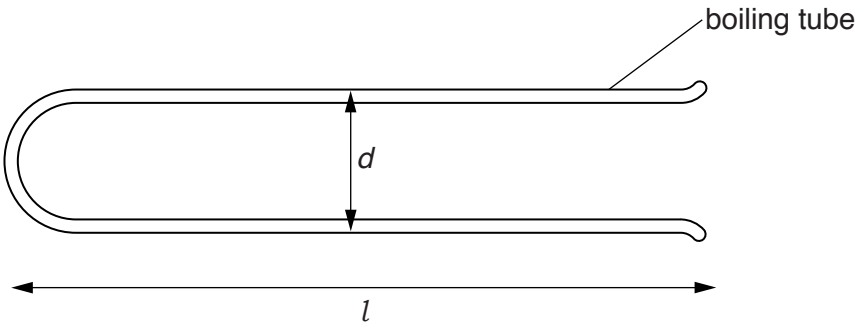


Fig. 1.1

(a) (i) • Measure the length l of the boiling tube provided.

l = ... cm

• Measure the external diameter d of the boiling tube. Use the wooden blocks to help you.

d = ... cm
[1]

(ii) Describe how you measured the external diameter d of the boiling tube. You may draw a diagram. Include one precaution you took to ensure that the value of d is as reliable as possible.

.....

.....

.....[2]

(iii) Assuming that the boiling tube is an approximate cylinder, calculate a value for its external volume V_1 using the equation $V_1 = \frac{\pi d^2 l}{4}$.

V_1 = ... cm^3 [1]

(b) (i)
- Completely fill the boiling tube with water.
- Pour the water from the boiling tube into the measuring cylinder.
- Read and record the volume V_2 of the water.

V_2 = ... cm^3 [1]

(ii) Describe briefly how you read the measuring cylinder to obtain a reliable value for the volume of water. You may draw a diagram.

.....

.....

.....[1]

(iii) Calculate the volume V_3 of the glass, using the equation $V_3 = V_1 - V_2$.

V_3 = ... cm^3 [1]

(c)
- Use the balance to measure the mass m of the boiling tube.

m = ...g

- Calculate the density ρ of the glass, using the equation $\rho = \frac{m}{V_3}$.

ρ = ...
[2]

(d) State one possible source of inaccuracy in the experiment. Explain what effect this inaccuracy would have on the value obtained for ρ.

.....

.....

.....

.....

.....[2]

[Total: 11]

2 In this experiment, you will investigate the relationship between potential difference and current for a resistor.

The circuit has been set up for you.

Carry out the following instructions, referring to Fig. 2.1.

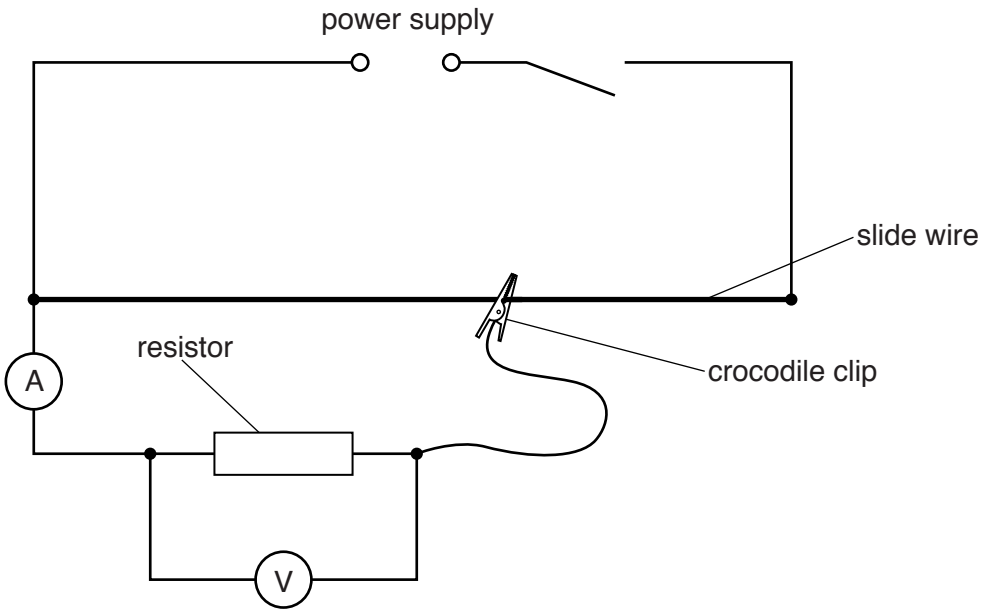


Fig. 2.1

(a)
- Switch on.
- Adjust the position of the crocodile clip on the slide wire until the potential difference V across the resistor is 0.4V.
- Record, in Table 2.1, the value of the current I shown on the ammeter.
- Move the crocodile clip and record values of I for V = 0.8V, 1.2V, 1.6V and 2.0V.
- Switch off.

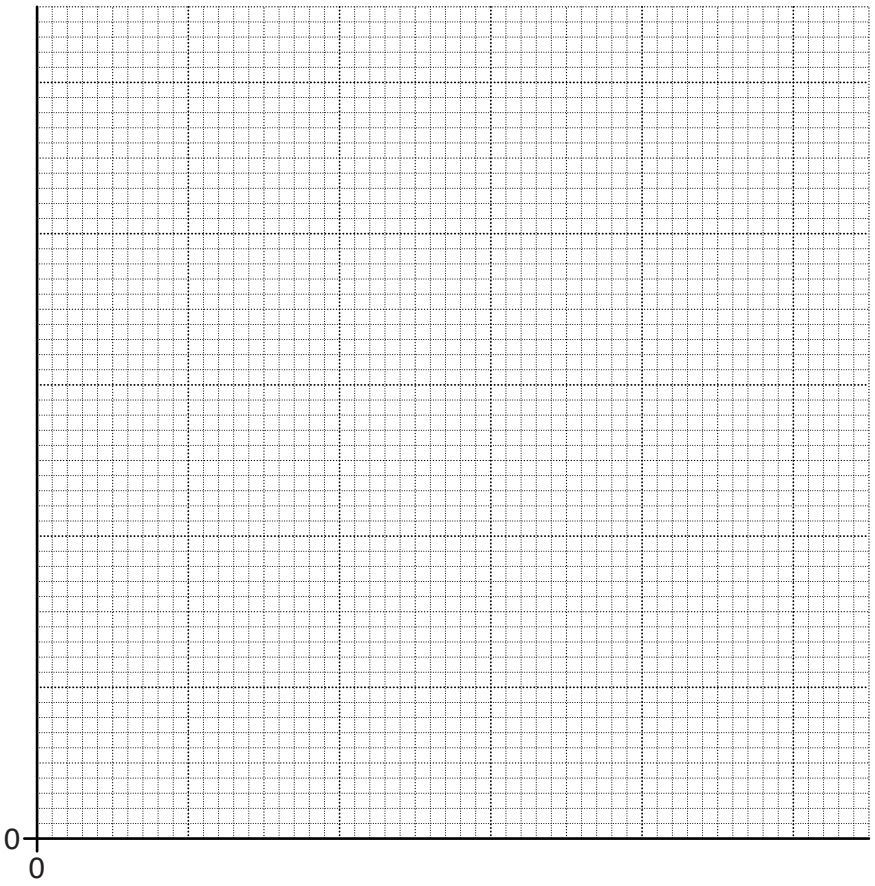
Table 2.1

V/V	I/A
0.4	
0.8	
1.2	
1.6	
2.0	

[1]

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(b) Plot a graph of V/V (y-axis) against I/A (x-axis). Start both axes at the origin (0,0).



[4]

(c) (i) Determine the gradient G of the graph. Show clearly on the graph how you obtained the necessary information.

G = ...[1]

(ii) The resistance R of the resistor is numerically equal to G.

Give a value for R, to a suitable number of significant figures for this experiment. Include the unit.

R = ...[2]

(d) A student suggests that potential difference and current for this resistor should be proportional.

State whether your graph supports this suggestion. Justify your statement by reference to your graph.

statement .....

.....

justification .....

.....

.....

[2]

(e) The student notices that her slide wire becomes very hot during the experiment.

Suggest a change to the apparatus or procedure that might prevent this.

.....

.....

.....[1]

[Total: 11]

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3 In this experiment, you will investigate the refraction of light by a transparent block. You will determine a quantity known as the refractive index for the material of the block.

Carry out the following instructions, using the separate ray-trace sheet provided. You may refer to Fig. 3.1 for guidance.

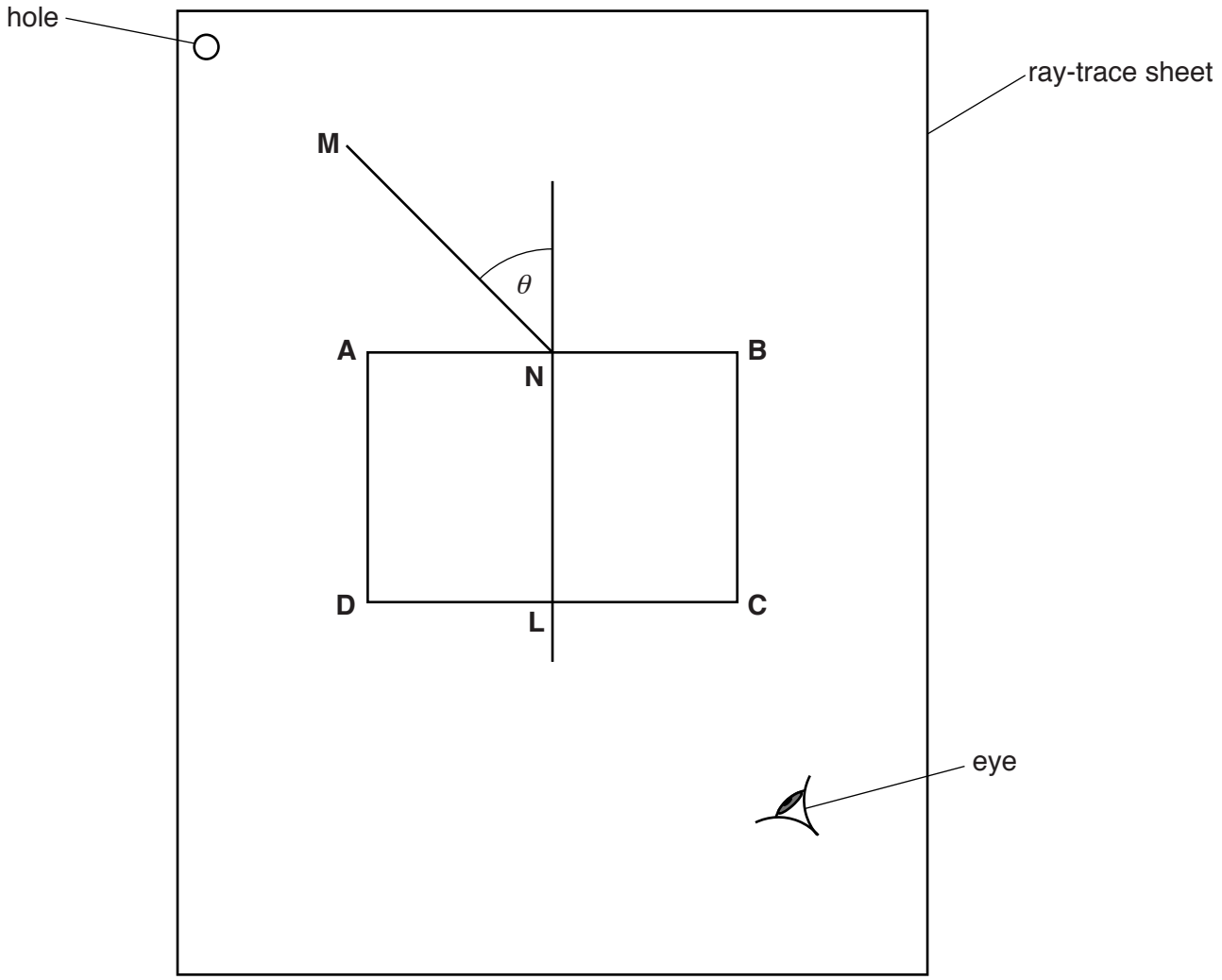


Fig. 3.1

(a)
- Place the block approximately in the centre of the ray-trace sheet. Carefully draw around the block and label the corners **ABCD** as indicated by Fig. 3.1.
- Remove the block from the ray-trace sheet.
- Draw a normal to line **AB** at its centre. Extend the normal so that it crosses line **CD**. Label the point at which the normal crosses **AB** with the letter **N** and the point at which it crosses **CD** with the letter **L**. [1]

(b) Draw a line **NM**, as indicated by Fig. 3.1, approximately 8 cm long and at an angle $\theta = 20°$. [1]

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(c) • Replace the block in exactly the same position as in **(a)**.

• Place two pins P_1 and P_2 on line **NM**, a suitable distance apart.

• Label the positions of P_1 and P_2.

• View the images of P_1 and P_2 through the block, from the direction indicated by the eye in Fig. 3.1. Place two pins P_3 and P_4, a suitable distance apart, so that pins P_3 and P_4, and the images of P_1 and P_2, all appear exactly one behind the other.

• Label the positions of P_3 and P_4.

• Remove the block and pins from the ray-trace sheet.

[1]

(d) (i) • Draw a line joining P_3 and P_4. Extend this line until it meets **NL**.

• Label the point at which this line crosses **CD** with the letter **E**, and the point at which it meets **NL** with the letter **F**.

• Draw a line joining points **N** and **E**.

[1]

(ii) • Measure the length *a* of line **NE**.

a = ...

• Measure the length *b* of line **FE**.

b = ...

• Calculate a value n_1 for the refractive index, using the equation $n_1 = \frac{a}{b}$.

n_1 = ...

[3]

(e) (i) • Repeat steps **(b)** and **(c)** for a new angle $\theta = 40°$.

• Draw a line joining the new positions of P_3 and P_4. Extend this line until it meets **NL**.

• Label the point at which this line crosses **CD** with the letter **G** and the point at which it meets **NL** with the letter **H**.

• Draw a line joining points **N** and **G**.

[1]

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(ii) • Measure the length c of line **NG**.

$c =$ .....

• Measure the length d of line **HG**.

$d =$ .....

• Calculate a second value n_2 for the refractive index, using the equation $n_2 = \frac{c}{d}$.

$n_2 =$ .....
[1]

(f) Describe two precautions you took in order to obtain reliable results in this experiment.

1. .....

.....

2. .....

.....
[2]

Tie your ray-trace sheet into this Booklet between pages 10 and 11.

[Total: 11]

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4 A student suggests that the area of the water surface will affect the rate of cooling of hot water in a container.

Plan an experiment to investigate the relationship between surface area and rate of cooling.

Write a plan for the experiment, including:

- the apparatus needed
- how you will obtain a range of surface areas
- instructions for carrying out the experiment
- the measurements you will take
- the precautions you will take to ensure that the results are as reliable as possible
- the graph you will plot from your results – you should sketch the axes, with appropriate labels.

A diagram is not required but you may draw one if it helps to explain your plan.

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[Total: 7]

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