Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

3251965538

PHYSICS **0625/62**

Paper 6 Alternative to Practical **February/March 2016**

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

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.
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.

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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CAMBRIDGE International Examinations

[Turn over

1 Some students are investigating the relationship between potential difference and current for a resistor. They are using the circuit shown in Fig. 1.1.

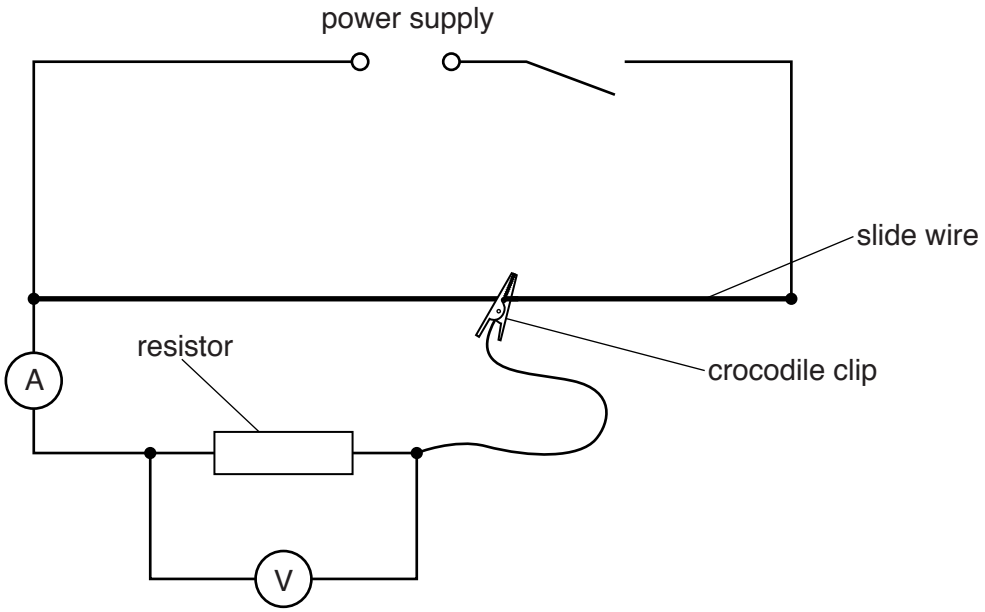


Fig. 1.1

The crocodile clip is connected at various positions on the slide wire, and the current and potential difference for the resistor are measured.

(a) The readings of potential difference V and current I for various positions of the crocodile clip are shown in Table 1.1.

Draw arrows on Figs. 1.2 and 1.3 to show the meter readings for the values of V and I in the first row of the table.

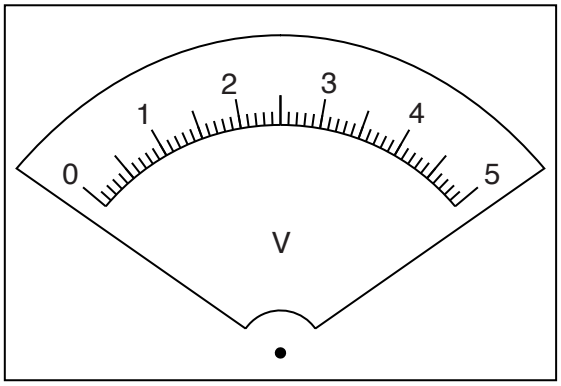


Fig. 1.2

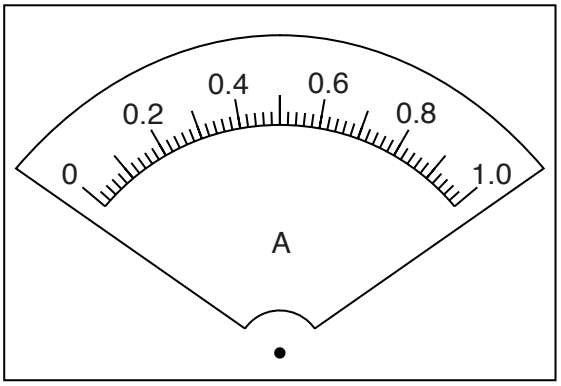


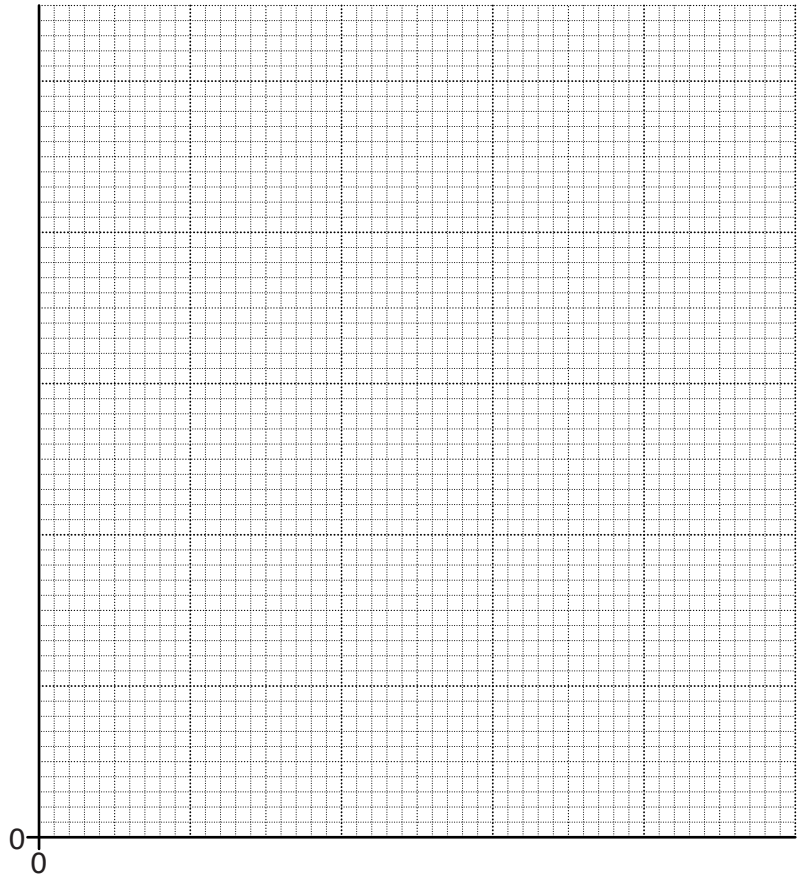
Fig. 1.3

[2]

Table 1.1

V/V	I/A
0.4	0.08
0.8	0.17
1.2	0.25
1.6	0.34
2.0	0.41

(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 value 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 students notice that the slide wire becomes very hot during the experiment.

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

.....

.....

.....[1]

[Total: 12]

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2 The class is carrying out an experiment to determine the density of glass.

Each student has a test-tube, as shown in Fig. 2.1.

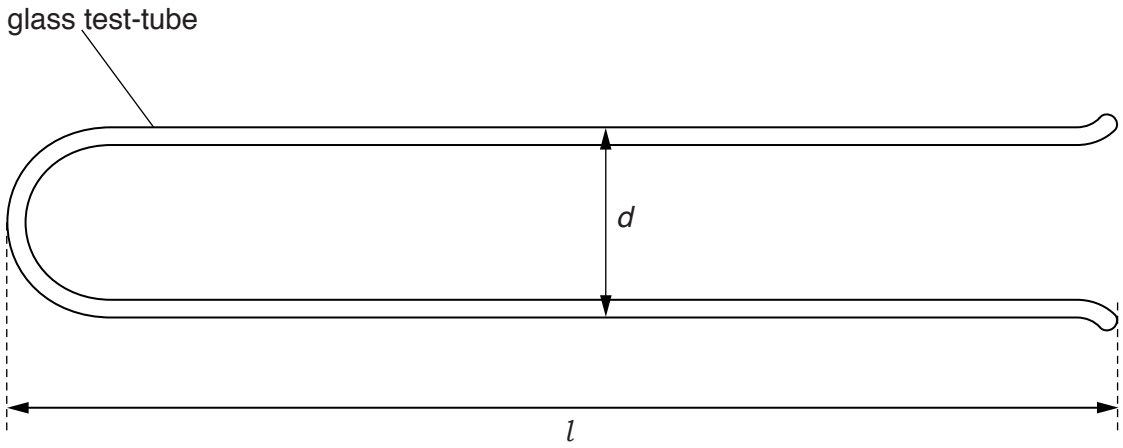


Fig. 2.1

(a) (i) • Measure the length l of the test-tube shown in Fig. 2.1.

l = ... cm

• Measure the external diameter d of the test-tube.

d = ... cm
[1]

(ii) A student uses two wooden blocks to help him to measure the diameter d of the test-tube.

Describe his method. You may draw a diagram. Include one precaution which could be taken to ensure that the value of d is as reliable as possible.

.....

.....

.....[2]

(iii) Assuming that the test-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) The test-tube is completely filled with water and then the water from the test-tube is poured into a measuring cylinder.

(i) Read and record the volume V_2 of the water as shown in Fig. 2.2.

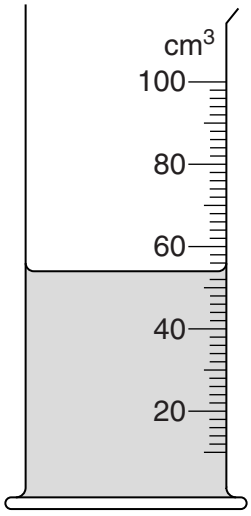


Fig. 2.2

V_2 = ... cm^3 [1]

(ii) Describe briefly how you would read the measuring cylinder to obtain a reliable value for the volume of water. You may add to Fig. 2.2 to illustrate your explanation.

.....

.....

.....[1]

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

V_3 = ... cm^3 [1]

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(c) One student uses a balance to measure the mass *m* of the test-tube, as shown in Fig. 2.3.

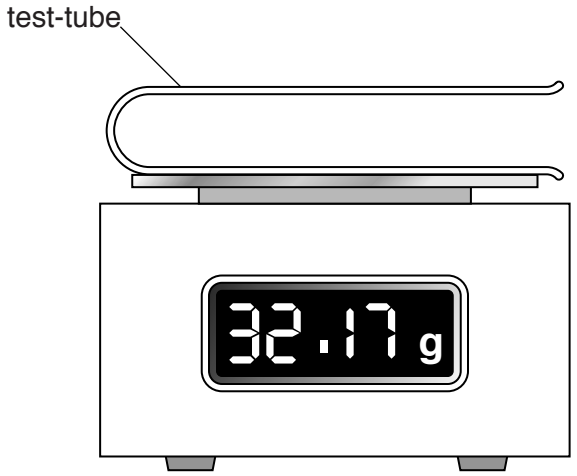


Fig. 2.3

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

ρ = ... [2]

(ii) Other students are using a balance which only measures to the nearest gram.

Record the mass *m* of the test-tube to the nearest gram.

m = ... g [1]

(d) The precision of the balance does not affect the accuracy of this experiment.

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

.....

.....

.....

.....

.....[2]

[Total: 12]

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3 A student is investigating the refraction of light by a transparent block. She uses her results to determine a quantity known as the refractive index for the material of the block.

The student's ray-trace sheet is shown in Fig. 3.1.

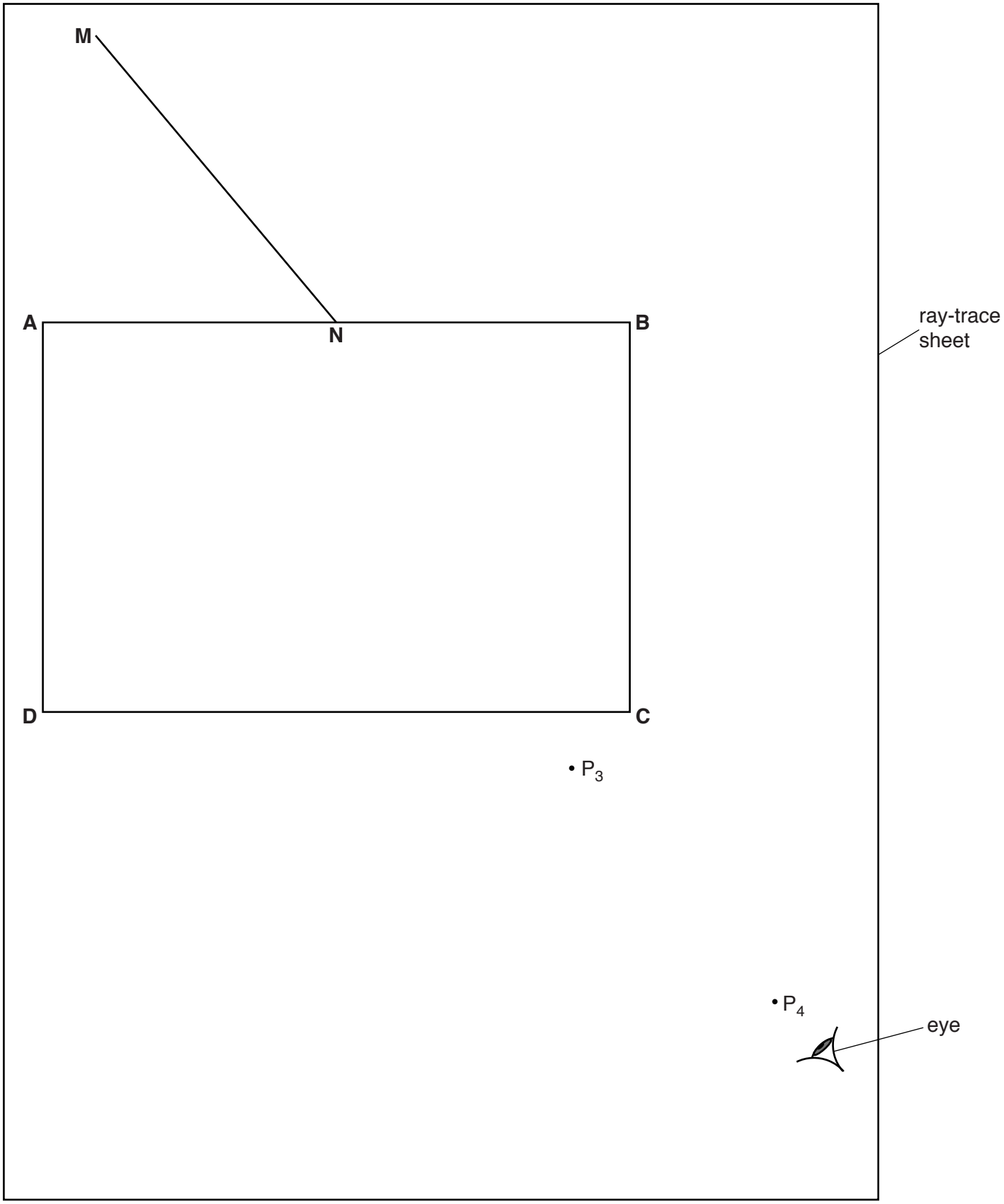


Fig. 3.1

(a) The student places a transparent block **ABCD** on the ray-trace sheet, as indicated in Fig. 3.1. She draws a line **NM**.

(i)
- Draw a normal to line **AB** at point **N**. The normal should start above **AB** and extend below **AB** so that it crosses line **CD**.
- Label the point at which the normal crosses **CD** with the letter **L**.

[1]

(ii) Measure the angle θ between the normal and line **NM**.

θ = ...[1]

(b) The student places two pins P_1 and P_2 on line **NM**, a suitable distance apart.

On Fig. 3.1, mark and label appropriate positions for P_1 and P_2. [1]

(c) The student views the images of P_1 and P_2 through the block, from the direction indicated by the eye in Fig. 3.1.

She places two pins P_3 and P_4, as shown in Fig. 3.1, so that pins P_3 and P_4, and the images of P_1 and P_2, all appear exactly one behind the other.

(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**.
- Measure the length *a* of line **NE**.

a = ...

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

b = ...

[2]

(ii) Calculate a value *n* for the refractive index, using the equation $n = \frac{a}{b}$.

n = ...[2]

(d) Describe two precautions that you would take in order to obtain reliable results in this type of experiment.

1. .....

.....

2. .....

.....

[2]

[Total: 9]

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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[7]

[Total: 7]

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