Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | |

CANDIDATE NUMBER | | | |

2895237765

PHYSICS **0625/53**

Paper 5 Practical Test **October/November 2018**

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 about 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	

This 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 and **4** blank pages.

DC (SC/CGW) 152107/4

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

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

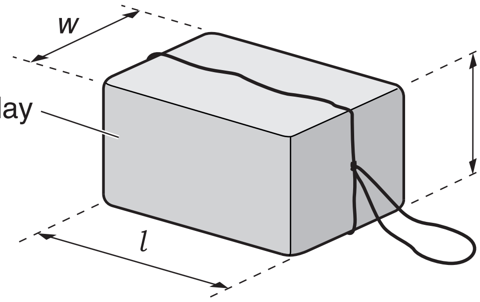


Fig. 1.1

(a) **(i)** Measure the length l, width w and height h of the block of modelling clay.

l = ... cm

w = ... cm

h = ... cm
[1]

(ii) Calculate the volume V_1 of the block, using your measurements from **(a)(i)** and the equation $V_1 = l \times w \times h$.

V_1 = ... cm^3 [1]

(b) Suggest a possible source of inaccuracy in measuring the block and describe an improvement to the procedure that will produce more reliable measurements of the block.

suggestion ....

....

improvement ....

....

....
[2]

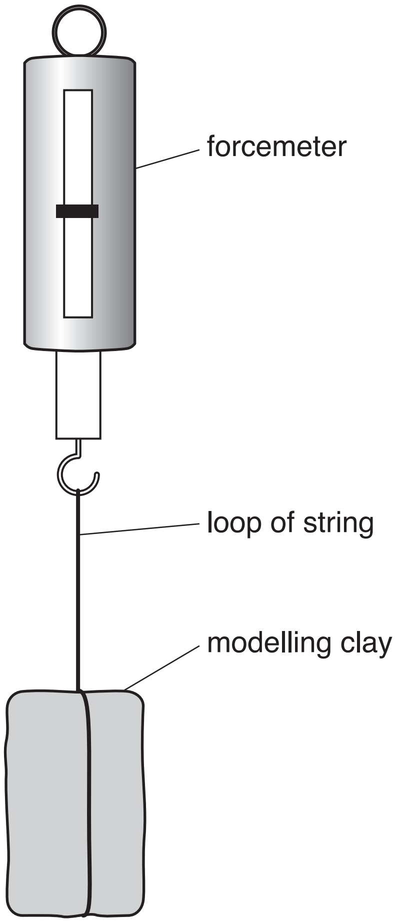


Fig. 1.2

(c) Measure the weight W of the block of modelling clay, as shown in Fig. 1.2.

W = ... N [1]

(d) Calculate a value ρ_1 for the density of the modelling clay, using your results from **(a)(ii)** and **(c)** and the equation $\rho_1 = \frac{W \times k}{V_1}$, where k = 100 g / N.

ρ_1 = ... [2]

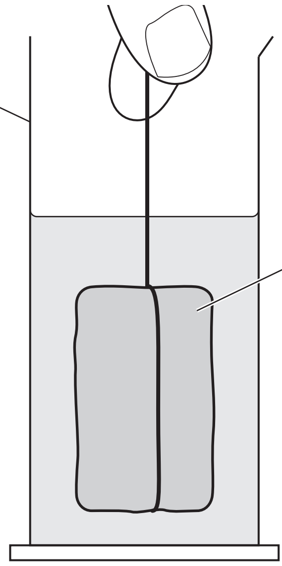


Fig. 1.3

(e) • Pour approximately 150 cm^3 of water into the measuring cylinder.

• Record the volume V_2 of the water in the measuring cylinder.

V_2 = ... cm^3

• Remove the loop of string from the forcemeter and lower the block of modelling clay carefully into the water in the measuring cylinder as shown in Fig. 1.3.

• Record the new reading V_3 of the measuring cylinder, with the piece of modelling clay in the water.

V_3 = ... cm^3
[1]

(f) Describe how a measuring cylinder is read to obtain a value for the volume of water. You may draw a diagram to help you.

....

....

.... [1]

(g) **(i)** Calculate another value ρ_2 for the density of modelling clay, using your readings from **(c)** and **(e)** and the equation $\rho_2 = \frac{W \times k}{(V_3 - V_2)}$, where $k = 100\,g/N$.

ρ_2 = ... [1]

(ii) Suggest which of ρ_1 or ρ_2 is likely to be the more accurate value for the density of the modelling clay.
Justify your answer by referring to the procedure.

....

....

.... [1]

[Total: 11]

2 In this experiment, you will determine the resistance per unit length of wire **X**.

The circuit has been set up for you.

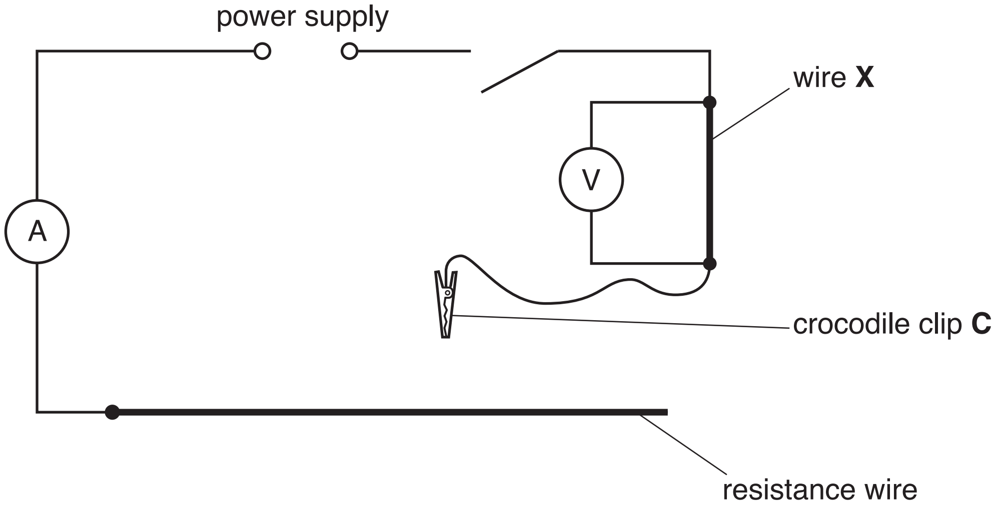


Fig. 2.1

(a) Carry out the following instructions, referring to Fig. 2.1.

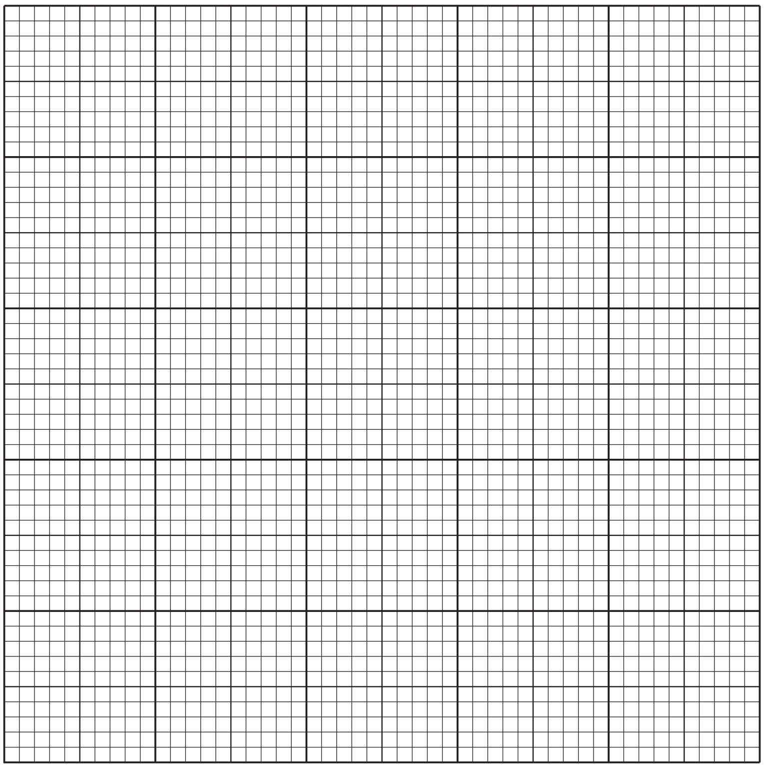
- Connect the crocodile clip **C** to the free end of the resistance wire.
- Switch on. Adjust the position of the crocodile clip **C** until the current shown on the ammeter is as near to 0.40 A as possible.
- Measure, and record in Table 2.1, the potential difference (p.d.) *V* across wire **X**. Switch off.
- Repeat the procedure for I = 0.50 A, 0.60 A, 0.70 A and 0.80 A.

Table 2.1

I / A	V / V
0.40	
0.50	
0.60	
0.70	
0.80	

[2]

(b) Plot a graph of V/V (y-axis) against I/A (x-axis).



[4]

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

G = ... [1]

(ii) Measure the length l of wire **X**.

l = ... cm [1]

(iii) Calculate the resistance R of each centimetre of wire **X**, using the equation $R = \frac{G \times k}{l}$, where $k = 1.0\,\Omega\,\text{cm}$.
Give the value for R, to a suitable number of significant figures for this experiment.

R = ... [2]

(d) A student discovers that the resistance wire becomes very hot when the crocodile clip is connected to short lengths of the wire.

Suggest an improvement that would help to reduce this effect.

....

....

.... [1]

[Total: 11]

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3 In this experiment, you will investigate the reflection of light by a plane mirror.

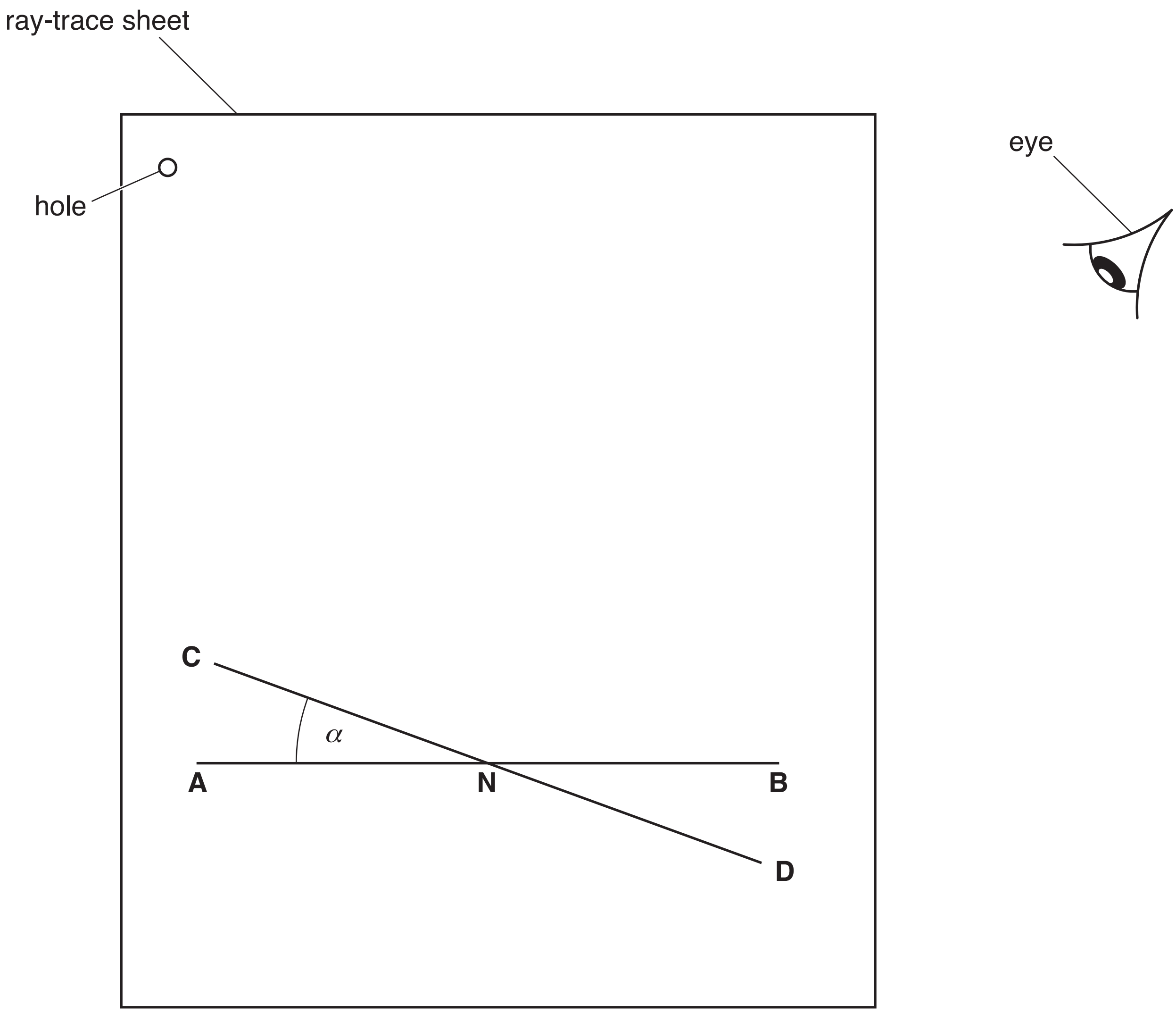

Fig. 3.1

(a) Carry out the following instructions, using the separate ray-trace sheet provided. Refer to Fig. 3.1 for guidance.

- Draw a line about 10 cm from the bottom of your ray-trace sheet. Label this line **AB**.
- Mark a point **N**, near the centre of **AB**.
- Draw a normal to **AB** at point **N**, towards the top of the page. Label the other end of this normal line **L**. [1]

(b) Draw a line **CD** passing through **N** and at an angle α to **AB** where $\alpha = 20°$. [1]

(c)
- Place two pins P_1 and P_2 on line **LN**, a suitable distance apart for ray tracing. Label the positions of P_1 and P_2.
- Place the reflecting surface of the mirror on line **CD** and view the images of P_1 and P_2 from the direction indicated by the eye in Fig. 3.1.
- Place two pins P_3 and P_4 some distance apart so that the images of P_1 and P_2, and the pins P_3 and P_4, all appear exactly one behind the other. Label the positions of P_3 and P_4.
- Remove the mirror and the pins.
- Draw a line passing through the P_3 and P_4 positions and reaching **LN**.
- Measure and record in Table 3.1, the angle θ between this line and the normal **LN**.

Table 3.1

α/°	θ/°
20	
35	

[3]

(d) Repeat steps **(b)** and **(c)** for an angle α = 35°, replacing pins P_1 and P_2 in their original positions in step **(c)**. [2]

(e) A student suggests that when the mirror is moved, the **change in** θ should be equal to twice the **change in** α.

State whether your readings support this idea. Justify your answer with reference to the readings.

statement ....

justification ....

....

....

[2]

(f) Suggest two precautions that you took to ensure accurate results from this type of experiment.

1 ....

....

2..

....

[2]

[Total: 11]

Tie your ray trace sheet between pages 10 and 11.

4 A student is investigating the conduction of thermal energy by metals.

Plan an experiment to compare the rates at which different metals conduct thermal energy.

You are **not** required to carry out the experiment.

The apparatus available includes:

strips of different metals, shaped as shown in Fig. 4.1
a test-tube in a clamp stand
a beaker
a supply of cold water
a supply of hot water.

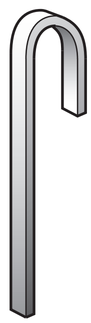

Fig. 4.1

The shorter section of each strip of metal can fit inside a test-tube.

Write a plan for the experiment.

You should:

- list any additional apparatus needed
- draw a labelled diagram of how the apparatus will be arranged
- explain briefly how you will carry out the experiment
- explain how the metals will be compared
- state the precautions which should be taken to obtain reliable results.

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