Cambridge Assessment International Education

Cambridge IGCSE™ (9–1)

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

4781411659

PHYSICS **0972/51**

Paper 5 Practical Test **October/November 2023**

1 hour 15 minutes

You must answer on the question paper.

You will need: The materials and apparatus listed in the confidential instructions

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 40.
- The number of marks for each question or part question is shown in brackets [ ].

For Examiner's Use	
1	
2	
3	
4	
Total	

This document has **12** pages. Any blank pages are indicated.

DC (AP) 332380

[Turn over

1 In this experiment, you will determine the weight of a metre ruler using a balancing method.

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

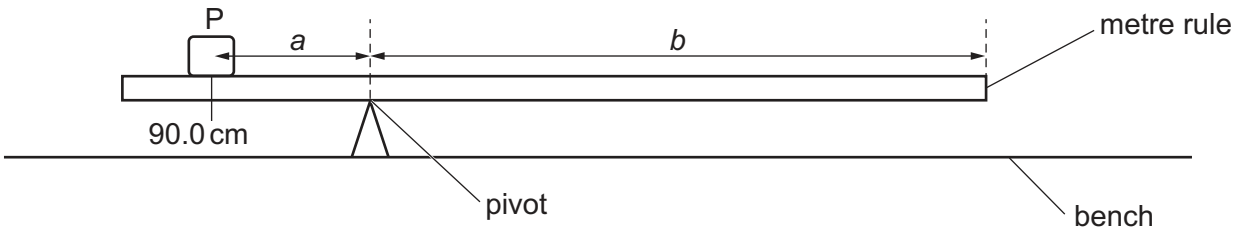

Fig. 1.1

(a)
- Place the metre ruler on the pivot.
- Place the load P on the metre ruler with its centre at the 90.0 cm mark.
- Keeping P at the 90.0 cm mark, adjust the position of the metre ruler on the pivot so that the metre ruler is as near as possible to being balanced.

Calculate, and record in the first row of Table 1.1, the distance *a* from the 90.0 cm mark to the pivot.

Calculate, and record in the first row of Table 1.1, the distance *b* from the pivot to the 0.0 cm end of the metre ruler.

Repeat the steps above, placing the load P at the 85.0 cm mark, 80.0 cm mark, 75.0 cm mark and 70.0 cm mark. Record the values of *a* and *b* in Table 1.1.

Table 1.1

a / cm	*b* / cm

[3]

(b) Plot a graph of a / cm (y-axis) against b / cm (x-axis). Start the y-axis at a = 0.0 cm. Start the x-axis at a suitable value for your results.

Draw the best-fit line.

[4]

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

G = ... [2]

(d) The weight W of the metre ruler is numerically equal to $2G$.

Calculate the weight W of the metre ruler.

W = ... [1]

(e) Suggest **one** practical reason why it is difficult to obtain accurate readings for a and b.

.....

..... [1]

[Total: 11]

2 In this experiment, you will investigate the resistance of a resistance wire.

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

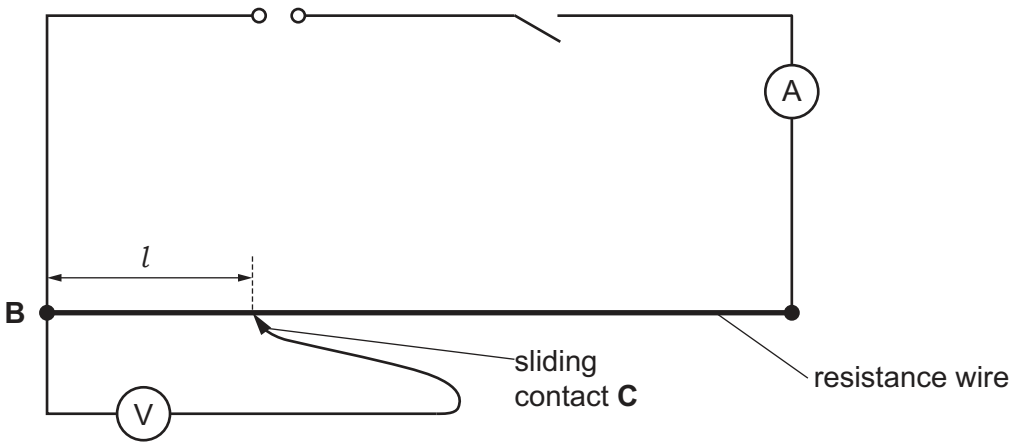

Fig. 2.1

(a) (i) Close the switch.

Measure the current I in the circuit.

I = ... [2]

(ii) Place the sliding contact **C** at a distance l = 20.0 cm from **B**.

Measure, and record in Table 2.1, the potential difference (p.d.) V across length l of the resistance wire.

Calculate, and record in Table 2.1, the resistance R of 20.0 cm of the resistance wire. Use the equation $R = \frac{V}{I}$.

Repeat the procedure using l = 60.0 cm and l = 100.0 cm.

Open the switch. [2]

(iii) Calculate, and record in Table 2.1, $\frac{R}{l}$ for each value of l. [1]

(iv) Complete the column headings in Table 2.1.

Table 2.1

l/	V/	R/	$\frac{R}{l}$ /
20.0			
60.0			
100.0			

[2]

(b) Look carefully at the values of $\frac{R}{l}$ in Table 2.1.

(i) Write a conclusion about the relationship between R and l.

.....

..... [1]

(ii) Justify your conclusion by reference to your results.

.....

..... [1]

(c) Use the values in Table 2.1 to estimate the resistance R_2 of 2.000 m of the resistance wire.

Show your working.

R_2 = ... [2]

[Total: 11]

3 In this experiment, you will investigate the magnification of the image produced by a lens.

Carry out the following instructions, referring to Fig. 3.1 and Fig. 3.2.

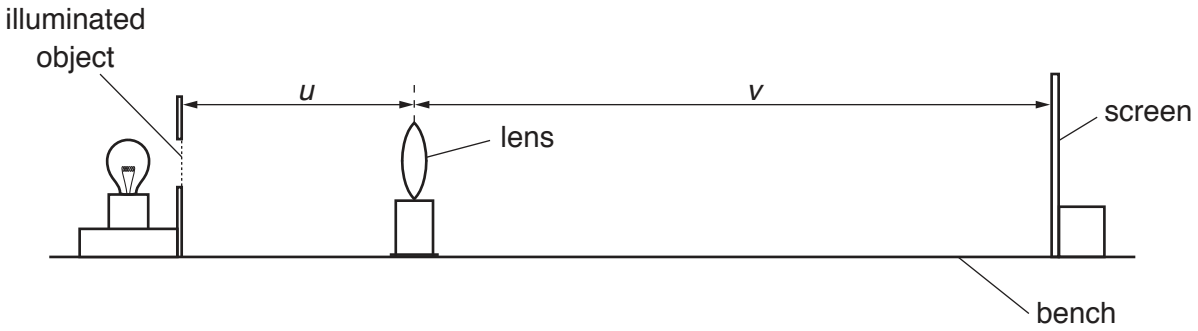

Fig. 3.1

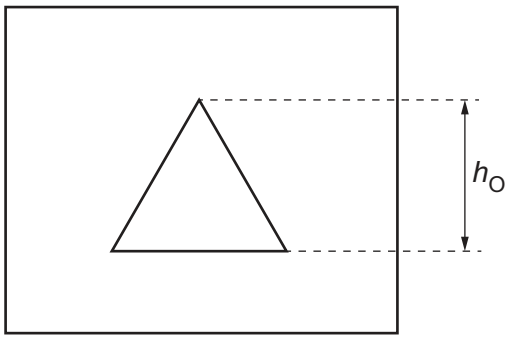

Fig. 3.2 (not to scale)

(a) Measure the height h_O of the illuminated object provided. Fig. 3.2 shows the height to be measured on your object.

h_O = ... [2]

(b)
- Place the lens a distance u = 20.0 cm from the illuminated object.
- Move the screen slowly until a clearly focused image is formed on the screen.
- Measure the distance v between the centre of the lens and the screen.
- Record v in Table 3.1.
- Calculate, and record in Table 3.1, the magnification m using the equation $m = \frac{v}{u}$.
- Measure, and record in Table 3.1, the height of the image h_I formed on the screen.
- Calculate, and record in Table 3.1, the ratio $\frac{h_I}{h_O}$, where h_O is the height of the object recorded in **(a)**.
- Repeat the procedure using u = 30.0 cm.

Table 3.1

u / cm	v / cm	m	h_I / cm	$\frac{h_I}{h_O}$
20.0				
30.0				

[5]

(c) A student suggests that the magnification m is equal to the ratio $\frac{h_I}{h_O}$.

(i) State whether your results agree with the suggestion. Justify your statement by reference to your results.

statement .....

justification .....

.....

.....

[2]

(ii) Suggest how you would continue to use the same apparatus to test the suggestion that the magnification m is equal to the ratio $\frac{h_I}{h_O}$.

.....

.....

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..... [2]

[Total: 11]

4 A student investigates the time taken for water to evaporate to dryness when heated from above.

Fig. 4.1 shows the set-up. The power of the heater is constant.

The following is also available:

- supply of water at room temperature
- metre ruler.

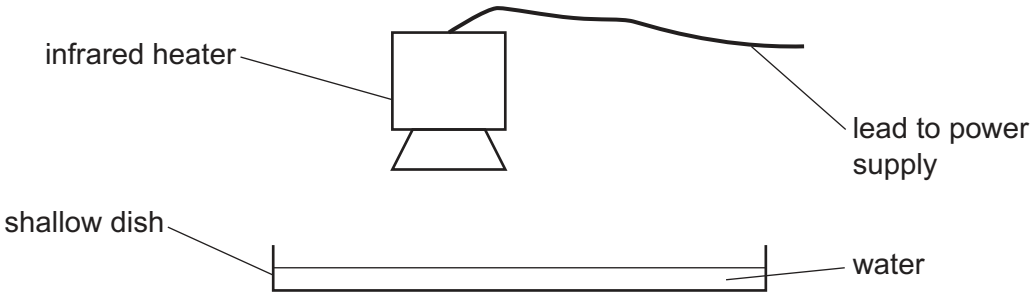

Fig. 4.1

Plan an experiment to investigate how **one** factor affects the time taken for the water to evaporate.

You are **not** required to do this investigation.

You do **not** need to write about safety precautions.

You should:

- state any additional apparatus required
- explain briefly how you would do the investigation
- state the key variables that you would keep constant
- draw a table, or tables, with column headings, to show how you would display your readings (you are **not** required to enter any readings in the table)
- explain how you would use your readings to reach a conclusion.

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