Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2467568878

PHYSICS **0625/61**

Paper 6 Alternative to Practical **October/November 2023**

1 hour

You must answer on the question paper.

No additional materials are needed.

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 [ ].

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

1 A student determines the weight of a metre ruler using a balancing method.

Fig. 1.1 shows the set-up.

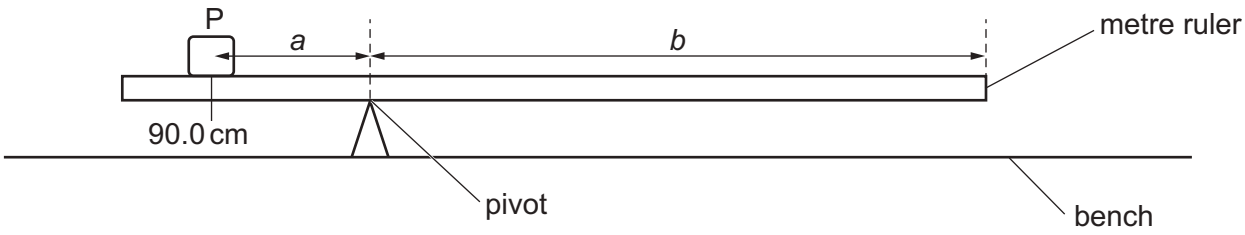


Fig. 1.1

(a) The student places the metre ruler on the pivot. She places a load P on the metre ruler at the 90.0 cm mark. She adjusts the position of the metre ruler on the pivot so that the metre ruler is as near as possible to being balanced.

The ruler balances with the pivot at the 75.0 cm mark.

Calculate the distance *a* from the 90.0 cm mark to the pivot.

Record the value of *a* in the first row of Table 1.1. [1]

(b) She records, in Table 1.1, the distance *b* from the pivot to the 0.0 cm end of the metre ruler.

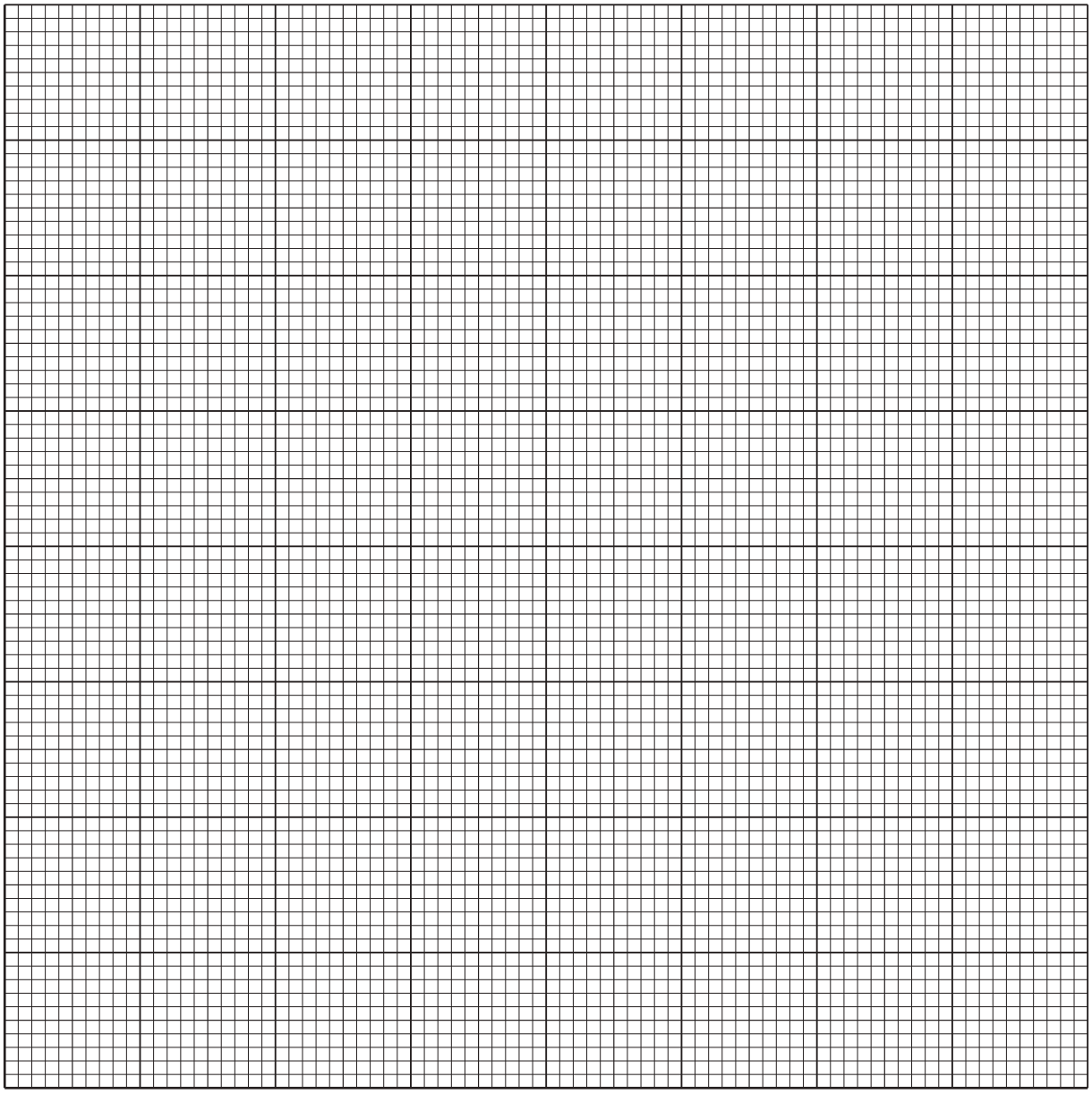
She repeats the procedure placing the load P at the 85.0 cm mark, 80.0 cm mark, 75.0 cm mark and 70.0 cm mark. She records the values of *a* and *b* in Table 1.1.

Table 1.1

a/cm	*b*/cm
	75.0
13.1	71.9
11.3	68.8
9.4	65.6
7.5	62.5

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 the 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 = ... [2]

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

.....

..... [1]

(f) Using only the apparatus provided for the experiment, explain briefly how you would determine the position of the centre of mass of the metre ruler.

.....

..... [1]

[Total: 11]

2 A student investigates the resistance of a resistance wire.

Fig. 2.1 shows the circuit that he uses.

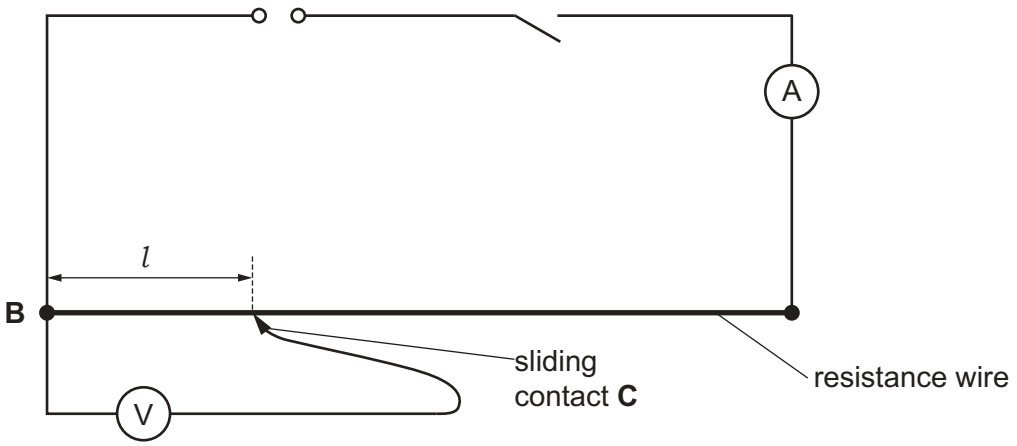


Fig. 2.1

(a) The student places a sliding contact **C** at a distance l = 20.0 cm from **B**.

He measures the potential difference (p.d.) V across length l of the resistance wire.
He measures the current I in the circuit.

The meters are shown in Fig. 2.2 and Fig. 2.3.

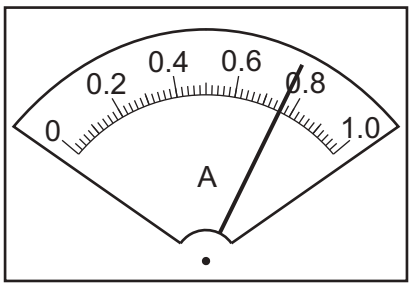


Fig. 2.2

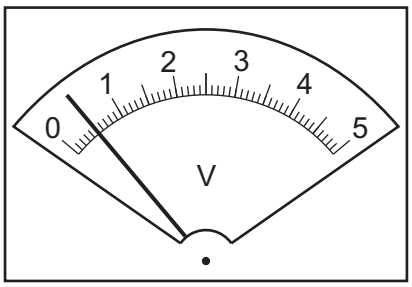


Fig. 2.3

Table 2.1

l/	V/	R/	$\frac{R}{l}$/
20.0			
60.0	1.6	2.1	0.035
100.0	2.5	3.3	0.033

(i) Write down the current I shown on the student's ammeter.

I = ... [1]

(ii) Record the potential difference V shown on the student's voltmeter in the first row of Table 2.1. [1]

(iii) Calculate, and record in Table 2.1, the resistance R of 20.0 cm of the resistance wire.

Use the equation $R = \frac{V}{I}$. [1]

(iv) Calculate, and record in the first row of Table 2.1, $\frac{R}{l}$ for l = 20.0 cm. [1]

(v) Complete the column headings in Table 2.1. [2]

(b) The student repeats the procedure using l = 60.0 cm and l = 100.0 cm. The readings and results are shown in Table 2.1.

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 the 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 = ... [3]

[Total: 11]

3 A student investigates the magnification of the image produced by a lens.

Fig. 3.1 shows the set-up.

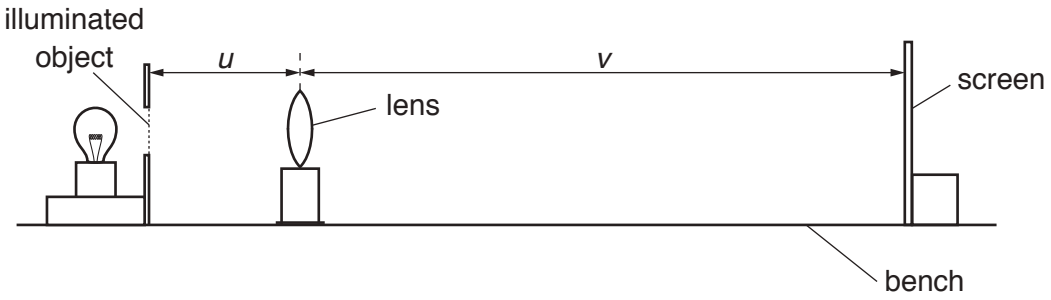


Fig. 3.1

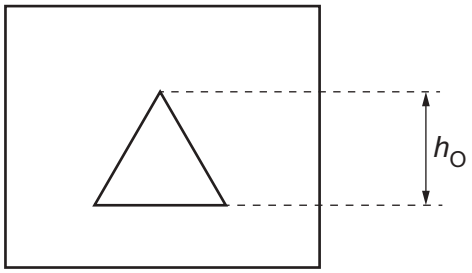


Fig. 3.2

(a) On Fig. 3.2, measure the height h_O of the illuminated object.

h_O = ... [2]

(b) Fig. 3.1 is drawn to 1/10th scale.

(i) On Fig. 3.1 measure the distance u.

u = ... [1]

(ii) The actual object distance U is 20.0 cm.

- The student places the lens at the distance U = 20.0 cm from the illuminated object.
- He moves the screen slowly until a clearly focused image is formed on the screen.
- He measures the distance V between the centre of the lens and the screen. On Fig. 3.1, this distance is represented to scale by the distance v.

Use Fig. 3.1 to determine the actual distance V between the centre of the lens and the screen. Show your working.

V = ... [2]

(iii) Calculate, and record in Table 3.1, the magnification m using the equation $m = \frac{V}{U}$. [1]

(iv) The student measures the height of the image h_I that is formed on the screen. The reading is shown in Table 3.1.

Calculate, and record in Table 3.1, the ratio $\frac{h_I}{h_O}$.

Table 3.1

U / cm	V / cm	m	h_I / cm	$\frac{h_I}{h_O}$
20.0			5.9	
30.0	34.8	1.16	1.8	1.2

[1]

(c) The student repeats the procedure using U = 30.0 cm. The readings and results are shown in Table 3.1.

Another student suggests that the magnification m is equal to the ratio $\frac{h_I}{h_O}$.

(i) State whether the results agree with the suggestion. Justify your statement by reference to the 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 $\frac{h_I}{h_O}$.

.....

.....

.....

..... [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.

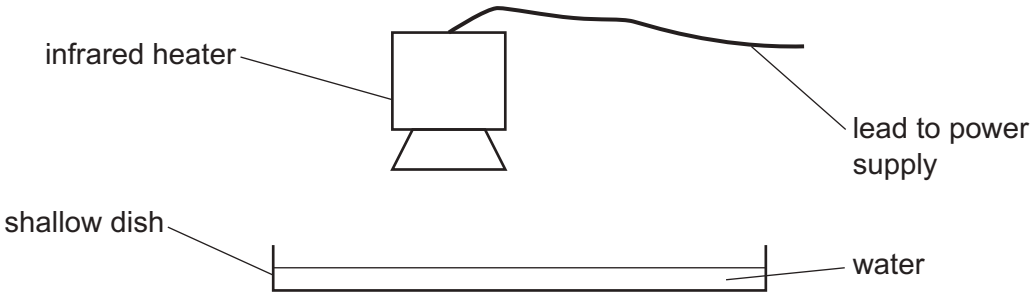


Fig. 4.1

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

You 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.