Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

PHYSICS **0625/53**

Paper 5 Practical Test **May/June 2020**

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	

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1 In this experiment, you will determine the weight of a metre rule.
Carry out the following instructions, referring to Fig. 1.1.

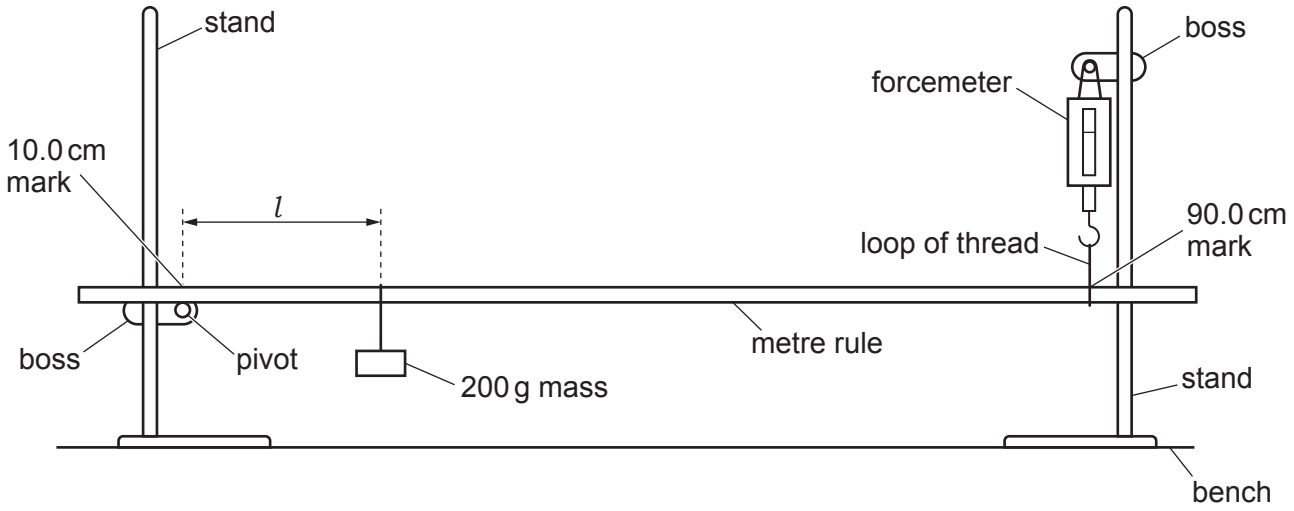

Fig. 1.1

(a) (i) Ensure that the 10.0 cm mark on the metre rule is immediately above the pivot and that the metre rule is suspended from the forcemeter at the 90.0 cm mark.
The metre rule should always be in this position before taking a reading.

View solution

Move the 200 g mass to a distance l = 20.0 cm from the pivot as shown in Fig. 1.1.
Adjust the height of the clamp holding the pivot so that the metre rule is horizontal.

Read, and record in Table 1.1, the forcemeter reading F.

Repeat this procedure for values of l = 30.0 cm, 40.0 cm, 50.0 cm and 60.0 cm.

Table 1.1

l / cm	F / N
20.0	
30.0	
40.0	
50.0	
60.0	

[2]

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(ii) Explain how you made sure that the metre rule was horizontal before each reading was taken.
You may draw a diagram.

View solution

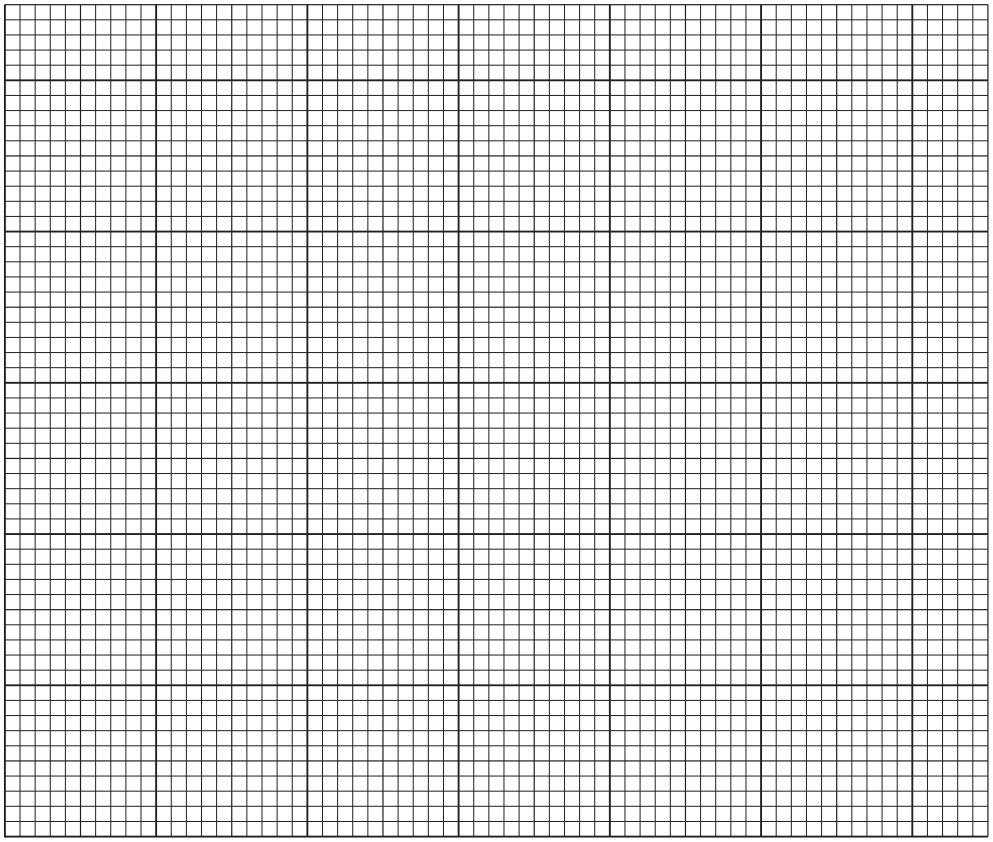
.....

.....

..... [1]

(b) Plot a graph of F/N (y-axis) against l/cm (x-axis).
Start your axes from the origin (0,0).

View solution



[4]

(c) **(i)** From your graph determine F_0, the value of F when $l = 0$.

F_0 = ... [1]

(ii) Calculate the weight W_R of the metre rule, using the equation $W_R = 2 \times F_0$.
Give W_R to a suitable number of significant figures for this experiment.

View solution

W_R = ... [2]

(d) A student carrying out this experiment places the 200 g mass on the metre rule instead of hanging it from the loop of thread.

View solution

Suggest which of these is likely to be the more accurate method.
Explain your answer by reference to the procedure.

.....

.....

..... [1]

[Total: 11]

2 In this experiment, you will investigate a circuit containing different combinations of resistors.
The circuit has been set up for you.
Carry out the following instructions, referring to Fig. 2.1.

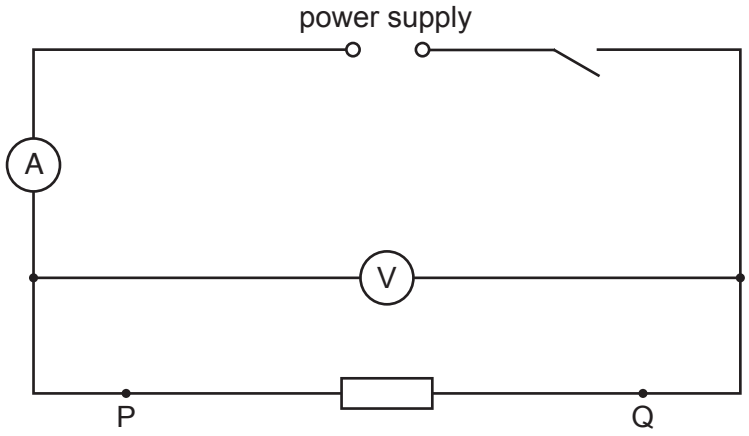


Fig. 2.1

(a) (i) Switch on.

Measure the potential difference V_1 and the current I_1 in the circuit.

V_1 = ...

I_1 = ...
[1]

Switch off.

(ii) Calculate a resistance R_1 using your values from **(a)(i)** and the equation $R_1 = \frac{V_1}{I_1}$.

R_1 = ... [1]

(b) (i) Connect both resistors in series between terminals P and Q as shown in Fig. 2.2.



Fig. 2.2

Switch on.

Measure the potential difference V_2 and the current I_2 in the circuit.

V_2 = ...

I_2 = ...
[1]

Switch off.

(ii) Calculate a resistance R_2 using your values from **(b)(i)** and the equation $R_2 = \frac{V_2}{(I_2 \times 2)}$.

View solution

R_2 = ... [1]

(c) (i) Connect both resistors in **parallel** between terminals P and Q as shown in Fig. 2.3.

View solution

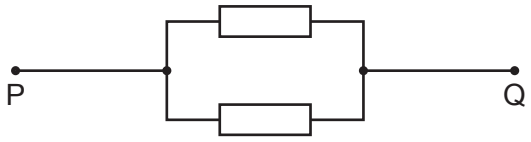


Fig. 2.3

Switch on.

Measure the potential difference V_3 and the current I_3 in the circuit.

V_3 = ...

I_3 = ...
[1]

Switch off.

(ii) Calculate a resistance R_3 using your values from **(c)(i)** and the equation $R_3 = \frac{(V_3 \times 2)}{I_3}$.

View solution

R_3 = ... [1]

(d) A student suggests that R_1, R_2 and R_3 should be equal.
State whether your results support this suggestion. Justify your statement with reference to your results.

statement .....

justification .....

.....
[2]

View solution

(e) (i) A student wants to determine R_1 by using a variable resistor to control the current in the circuit. Complete the circuit in Fig. 2.4 to show a variable resistor connected for this purpose. You are **not** required to do this experiment.

View solution

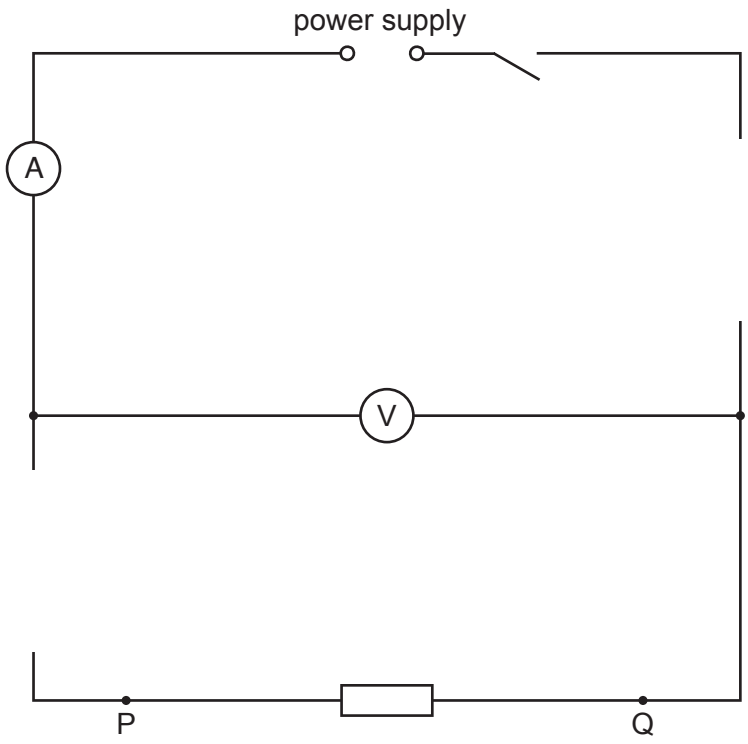


Fig. 2.4

[2]

(ii) Briefly explain how using the circuit in Fig. 2.4 will give a more reliable value for R_1 than using the procedure you were asked to carry out in **(a)**.

.....

.....

..... [1]

[Total: 11]

View solution

3 In this experiment you will determine the focal length of a converging lens.
Carry out the following instructions, referring to Fig. 3.1.

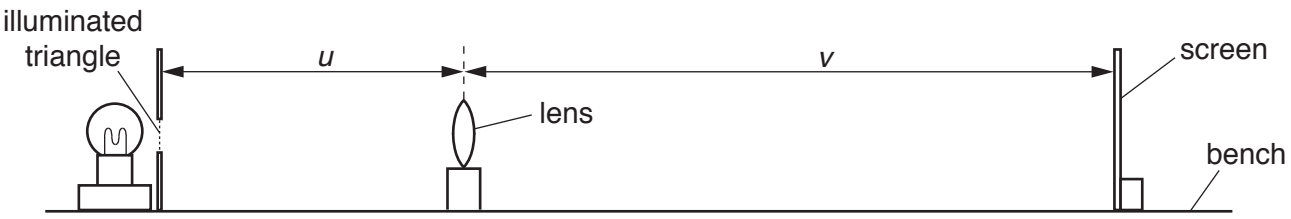


Fig. 3.1

Method 1

(a) Arrange the apparatus as shown in Fig. 3.1.

View solution

Place the lens a distance u = 20.0 cm from the illuminated triangle.

Place the screen near the lens.

Move the screen until a sharp image of the triangle is seen on the screen.

(i) Measure the distance v between the lens and the screen as indicated in Fig. 3.1.

v = ... [1]

(ii) Calculate a value f_1 for the focal length of the lens. Use the equation

View solution

$$f_1 = \frac{uv}{(u + v)} .$$

f_1 = ... [1]

Method 2

(b) Keep the screen in the same position so that the values of *u* and *v* are the same as in (a).

(i) Move the lens closer to the screen until another sharp image of the triangle is seen on the screen.

View solution

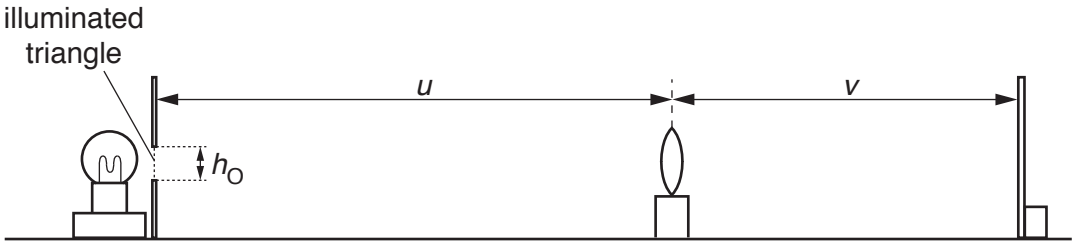


Fig. 3.2

Measure the new distance *u* between the illuminated triangle and the lens as indicated in Fig. 3.2.

u = ...

Measure the new distance *v* between the lens and the screen.

v = ...

[2]

(ii) Calculate a second value f_2 for the focal length of the lens. Use the equation

$$f_2 = \frac{uv}{(u + v)} .$$

View solution

f_2 = ... [1]

Method 3

(c) Keep the screen in the same position so that the values of *u* and *v* are the same as in (b).

(i) Measure h_O, the height of the illuminated triangle, as indicated in Fig. 3.2.

View solution

h_O= .....

Measure h_I, the height of the image of the triangle on the screen.

h_I = ...

[1]

(ii) Calculate a value *M* for the magnification, using the equation $M = \frac{h_I}{h_O}$.

View solution

M = ... [1]

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(iii) Calculate a third value f_3 for the focal length of the lens.
Use your value of v from **(b)(i)** and the equation

$$f_3 = \frac{v}{(M + 1)} .$$

View solution

f_3 = ... [1]

(d) State **one** precaution that you took to ensure that the **measurements** of u and v in this experiment are as reliable as possible.

.....

..... [1]

(e) **(i)** Explain why **Method 3** is likely to produce a less accurate value for the focal length than **Method 1**.

.....

.....

..... [1]

(ii) Suggest **one** improvement to make **Method 3** more accurate.

View solution

.....

.....

..... [1]

[Total: 11]

4 A student investigates the factors affecting the electrical output of a solar cell. A solar cell is a device which transforms light energy into electrical energy.

Plan an experiment which will enable him to investigate how the potential difference across the terminals of the solar cell varies with the angle of the incident light.

View solution

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

The apparatus available includes:

a solar cell as shown in Fig. 4.1
a laboratory lamp.

In your plan, you should:

- list any additional apparatus needed
- state the key variables to be kept constant
- explain briefly how to carry out the experiment, including any precautions that must be taken to ensure reliable results
- draw a table, with column headings, to show how to display the readings (you are **not** required to enter any readings in the table)
- explain how to use the readings to reach a conclusion.

You may add to Fig. 4.1 or draw another diagram if it helps to explain your plan.

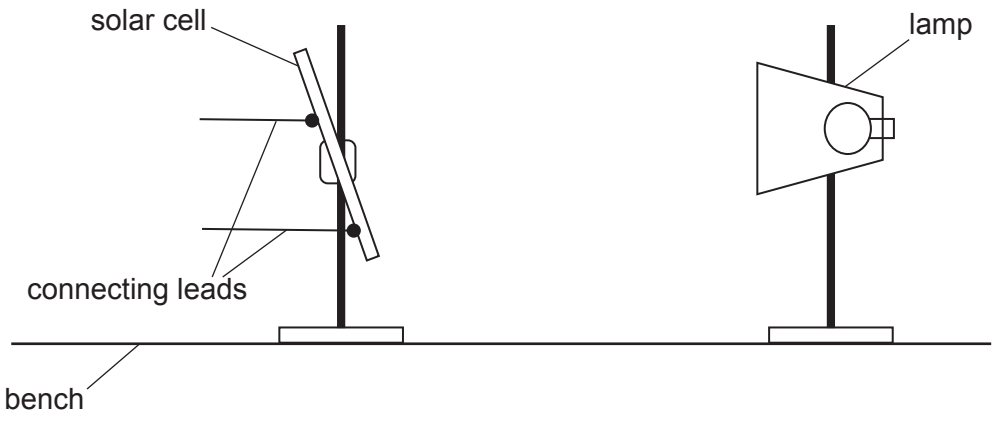

Fig. 4.1

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