Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME										
CENTRE NUMBER						CANDIDATE NUMBER				

5586709821

PHYSICS **0625/53**

Paper 5 Practical Test **May/June 2022**

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.

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1 In this experiment, you will investigate the forces supporting a metre rule.

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

Do **not** attempt to change the position of either newton meter by adjusting the positions of the loops of thread attached to them.

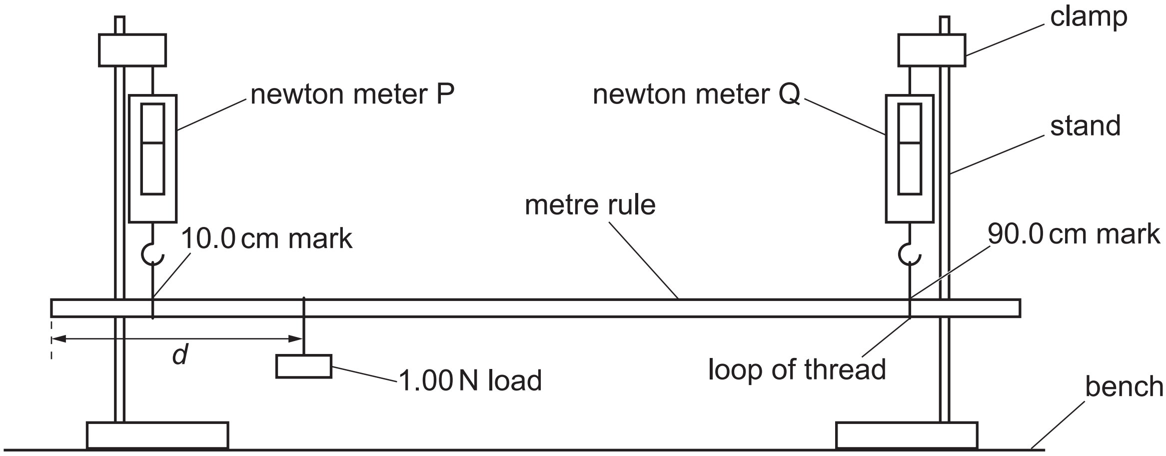


Fig. 1.1

(a) Move the 1.00 N load to a distance d = 25.0 cm from the 0.0 cm end of the rule.

Move one stand slightly, if necessary, so that the newton meters are as near to vertical as possible.

Read, and record in Table 1.1, the value F_P on newton meter P and the value F_Q on newton meter Q.

Repeat this procedure for d = 35.0 cm, d = 45.0 cm, d = 55.0 cm and d = 65.0 cm.

Table 1.1

d / cm	F_P / N	F_Q / N
25.0		
35.0		
45.0		
55.0		
65.0		

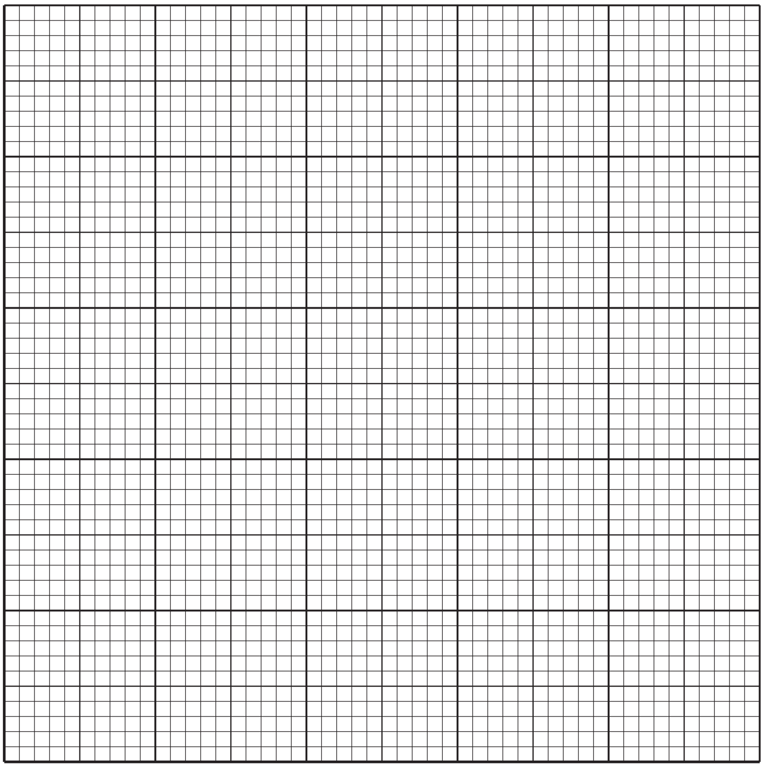
[2]

(b) Plot a graph of F_P / N (y-axis) against d / cm (x-axis).

On the same axes, and using the same scales, plot a graph of F_Q / N (y-axis) against d / cm (x-axis).

Draw two best-fit lines, one for each set of plots. Show clearly on your graph which line is for F_P and which line is for F_Q.

F_P / N
F_Q / N



[5]

(c) From your graph, determine F_0, the value of F_P where the two best-fit lines cross.

F_0 = ...

Calculate the weight W_R of the metre rule, using the equation $W_R = (2 \times F_0) - k$, where k = 1.00 N.

W_R = ...
[2]

(d) This experiment can be done by moving a clamp to make the rule horizontal before taking each reading.

Explain how to make sure that the rule is horizontal.
You may draw a diagram.

....

....

.... [1]

(e) A student does the experiment with the same equipment as you. He reads values of F_P which are the same as yours but his values of F_Q are all higher than yours by 0.10 N.

Suggest a reason for this difference. Assume that your values of F_P and F_Q in Table 1.1 are correct.

....

....

.... [1]

[Total: 11]

2 In this experiment, you will investigate how the volume of water in a beaker affects the rate at which the water cools.

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

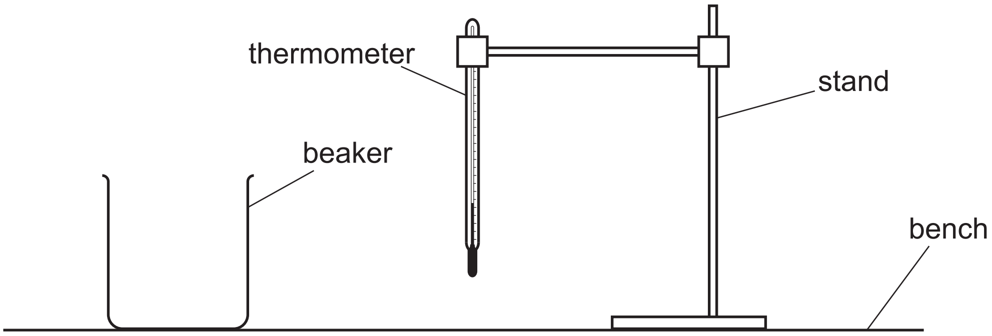


Fig. 2.1

(a) During this experiment, the thermometer must remain clamped securely to the stand.

Pour 150 cm^3 of hot water into the beaker.
Place the thermometer in the water.
Wait until the reading on the thermometer stops rising.

In the first row of Table 2.1, record the temperature θ of the water at t = 0 and immediately start the stop-clock.
Record the temperature θ of the water at times t = 30 s, t = 60 s, t = 90 s, t = 120 s, t = 150 s and t = 180 s.

Remove the thermometer from the beaker and tip out the water. [1]

(b) (i) Repeat **(a)** using 50 cm^3 of hot water. [2]

(ii) Complete the headings in Table 2.1.

Table 2.1

	beaker with 150 cm^3 of hot water	beaker with 50 cm^3 of hot water
t /	θ /	θ /
0		
30		
60		
90		
120		
150		
180		

[1]

(c) Write a conclusion stating how the volume of water affects the rate of cooling of the water. Justify your answer by reference to your results.

....

....

....

.... [2]

(d) **(i)** Using your results for 50 cm^3 of water, calculate the average cooling rate x for the first 90 s of the experiment. Use your readings from Table 2.1 and the equation

$$x = \frac{\theta_0 - \theta_{90}}{T}$$

where T = 90 s and θ_0 and θ_{90} are the temperatures at t = 0 and t = 90 s.
Include the unit for the cooling rate.

x = ... [1]

(ii) A student does this experiment in a room with a much higher room temperature than your room.

State how this affects her value of x in **(d)(i)**.
Explain your answer by reference to your results from the beaker with 50 cm^3 of hot water.

statement ....

explanation ....

....

....
[2]

(e) Some thermal energy is lost from the sides of the beaker.
Another student wishes to find out how much this loss of thermal energy affects the cooling rate of 50 cm^3 of water.

Briefly describe an additional experiment that the student can carry out to investigate this. Explain how the results can be used to determine how much this loss affects the cooling rate.

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

additional experiment ....

....

use of results ....

....
[2]

[Total: 11]

3 In this experiment, you will determine the focal length of a converging lens by different methods.

Method 1

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

(a) Arrange the illuminated object, lens and mirror as shown in Fig. 3.1.

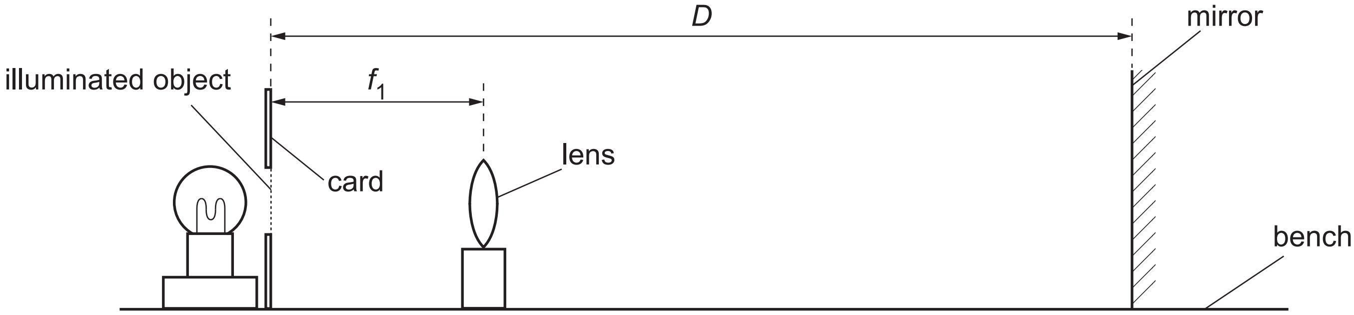


Fig. 3.1

(i) Set the distance *D* between the mirror and the illuminated object to 40 cm.

Move the lens until a sharp image appears on the front of the card, by the side of the illuminated object.

Measure the distance f_1 between the lens and the illuminated object. This is a value for the focal length of the lens.

f_1 = ... [1]

(ii) Briefly describe a technique to obtain an image on the card that is as sharp as possible in this experiment.

....

....

.... [1]

Method 2

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

(b) Set up the lens, illuminated object and screen as shown in Fig. 3.2.

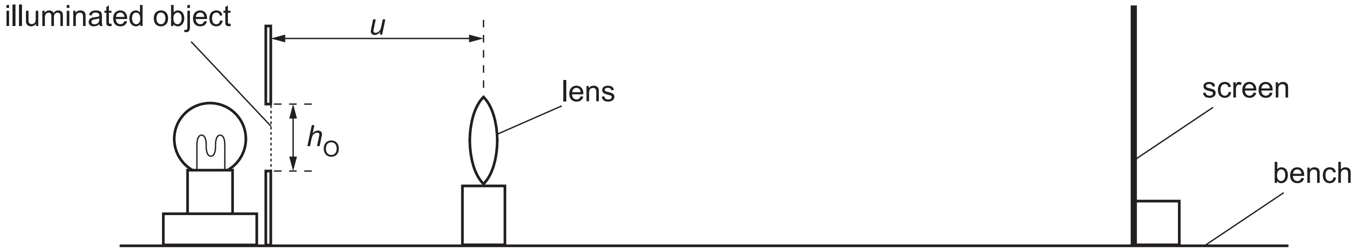


Fig. 3.2

Set the distance between the illuminated object and the lens to u = 20.0 cm.

Move the screen until a sharp image of the illuminated object appears on the screen.

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

h_O = ...

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

h_I = ...
[2]

(ii) Calculate a value W using the equation $W = \frac{h_O}{h_I}$.

W = ...

Calculate a second value f_2 for the focal length of the lens, using the equation

$$f_2 = \frac{u}{(W + 1)}.$$

f_2 = ...
[2]

(iii) Describe **one** difficulty that can be experienced when measuring the height of the image. Suggest an improvement to overcome this difficulty.

difficulty ....

....

improvement ....

....
[2]

(c) A student suggests that f_1 and f_2 should be equal.

State whether your results support this suggestion.
Justify your statement by reference to your results.

statement ....

justification ....

....
[2]

(d) Describe **one** precaution you took to obtain reliable measurements of f_1 and u in this experiment.

....

....
[1]

[Total: 11]

4 A student investigates the resistance of a light-dependent resistor (LDR).
The resistance of an LDR changes as the intensity of light falling on it varies.

The resistance R of the LDR is calculated using the equation $R = \frac{V}{I}$

where V is the potential difference (p.d.) across the LDR and I is the current in the LDR.

Plan an experiment to investigate how the light intensity affects the resistance of an LDR.
You are **not** required to carry out the experiment.

The apparatus available includes:
an LDR
equipment to connect the circuit, part of which is shown in Fig. 4.1
a lamp with a power supply.

In your plan, you should:

- complete the circuit diagram in Fig. 4.1 to show a voltmeter connected to measure the potential difference across the LDR
- state how the light intensity falling on the LDR will be varied and list any additional apparatus needed
- explain briefly how to do the experiment, including any precautions taken to ensure reliable results
- state **one** key variable to be kept constant
- draw a table, or tables, 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.

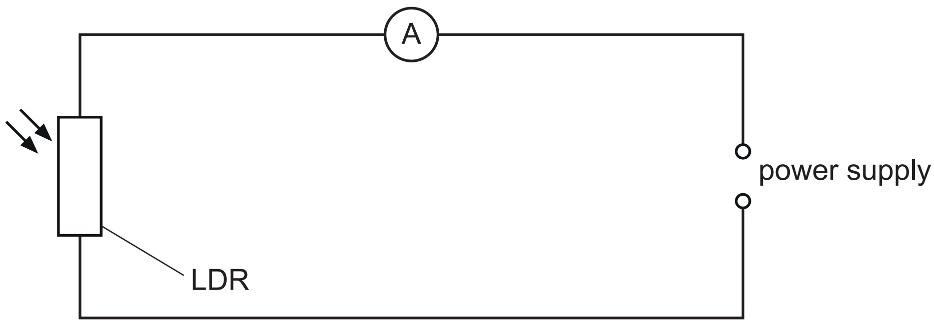


Fig. 4.1

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