Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | CANDIDATE NUMBER

9783901804

PHYSICS **0625/62**

Paper 6 Alternative to Practical **October/November 2019**

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name on all the work you hand in.
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.

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.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **11** printed pages and **1** blank page.

DC (JC/SG) 176069/4

Cambridge Assessment International Education

[Turn over

1 A student investigates a pendulum. Fig. 1.1 and Fig. 1.2 show some of the apparatus used.

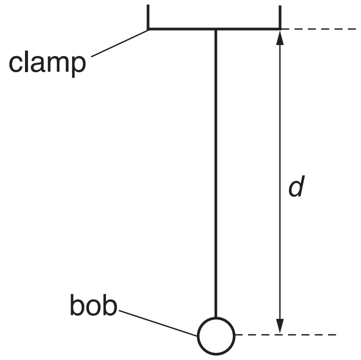

Fig. 1.1

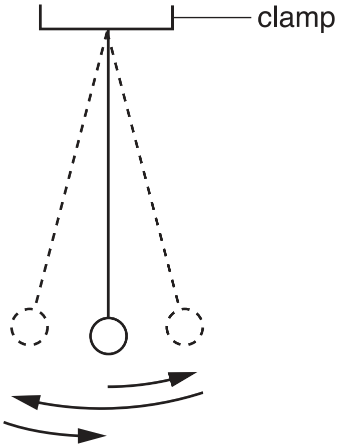

Fig. 1.2

(a) The student adjusts the length of the pendulum until the distance d, measured to the centre of the bob, is 50.0 cm. State one precaution that you would take to obtain the length of 50.0 cm as accurately as possible.

....

.... [1]

(b) The student displaces the bob slightly and releases it so that it swings. Fig. 1.2 shows one complete oscillation of the pendulum.

(i) He measures the time t for 20 complete oscillations. The time t is shown on the stopwatch in Fig. 1.3.

Fig. 1.3

In the first row of Table 1.1, record the time t shown in Fig. 1.3. [1]

(ii) Calculate, and record in Table 1.1, the period T of the pendulum. The period is the time for one complete oscillation. [1]

(iii) Calculate T^2. Record its value in Table 1.1. [1]

(c) The student repeats the procedure in **(b)** using d = 60.0 cm, 70.0 cm, 80.0 cm and 100.0 cm. The readings are shown in Table 1.1.

Table 1.1

d / cm	t / s	T / s	T^2 / s^2
50.0			
60.0	30.00	1.50	2.25
70.0	33.20	1.66	2.76
80.0	35.80	1.79	3.20
100.0	39.80	1.99	3.96

Plot a graph of T^2 / s^2 (y-axis) against d / cm (x-axis). You do **not** need to start your axes at the origin (0,0).

[4]

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

G = ... [2]

(e) Calculate the acceleration of free fall g in m/s^2 using the equation $g = \frac{0.395}{G}$, where G is your gradient from **(d)**.

Write down the value of g to a suitable number of significant figures for this experiment.

g = ...m/s^2 [2]

[Total: 12]

2 A student determines the resistance of a resistance wire.

She uses the circuit shown in Fig. 2.1.

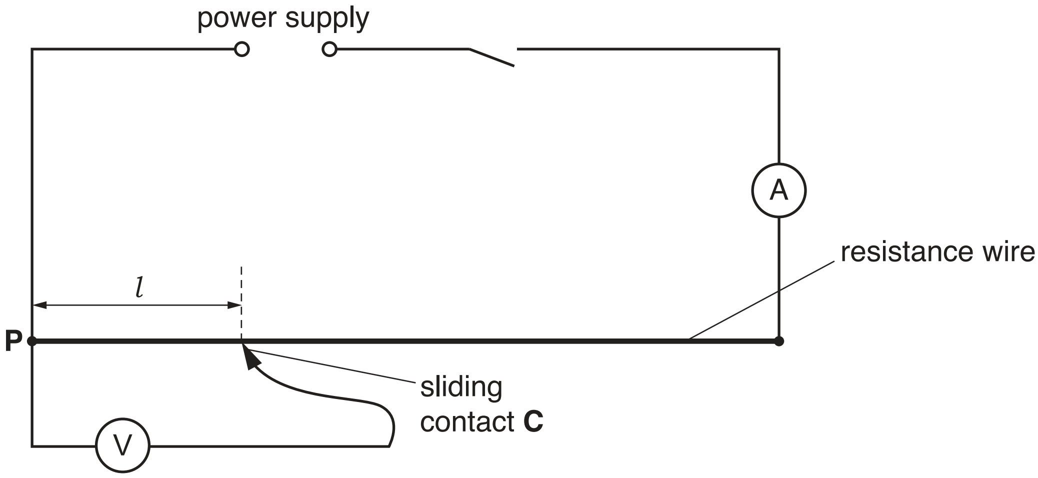

Fig. 2.1

(a) She measures the current I in the circuit. Write down the current reading shown in Fig. 2.2.

I = ... [2]

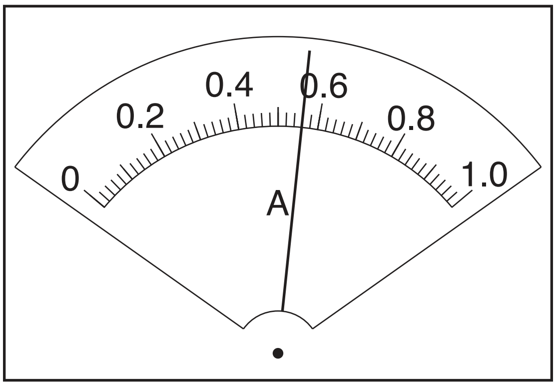

Fig. 2.2

(b) She places the sliding contact **C** at a distance l = 20.0 cm from **P**.

She records the potential difference V across the length l of the resistance wire.

She repeats the procedure using l values of 40.0 cm, 60.0 cm, 80.0 cm and 100.0 cm.

The readings are shown in Table 2.1.

Table 2.1

l / cm	V /	R /
20.0	0.60	
40.0	1.10	1.96
60.0	1.71	3.05
80.0	2.30	4.11
100.0	2.78	4.96

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

[2]

(ii) Complete the column headings in Table 2.1. [1]

(c) Look carefully at the values of l and R in Table 2.1.

(i) Tick **one** box to show your conclusion from the results.

☐ R is constant within the limits of experimental accuracy.

☐ R is directly proportional to l within the limits of experimental accuracy.

☐ R decreases as l increases.

☐ There is no simple relationship between R and l.

[1]

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

....

....

.... [1]

(d) **(i)** Use the values in Table 2.1 to estimate the potential difference V_e across 50.0 cm of the resistance wire.

V_e = ... [1]

(ii) Calculate the resistance of 50.0 cm of the resistance wire using the equation $R = \frac{V_e}{I}$.

Use the value of current I from part **(a)**. Give your answer to a suitable number of significant figures for this experiment and include the unit.

R = ... [2]

(e) In this type of experiment, it is sensible to keep the temperature of the resistance wire as close to room temperature as possible. Suggest **one** simple way to minimise the rise in temperature of the resistance wire.

....

.... [1]

[Total: 11]

3 A student determines the focal length *f* of a lens.

Fig. 3.1 shows the set-up.

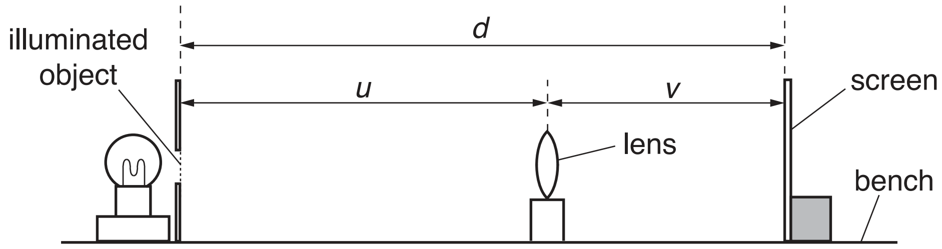

Fig. 3.1

(a) • He places the screen at a fixed distance from the illuminated object.

• He places the lens between the object and the screen so that the lens is very close to the screen.

• He moves the lens slowly away from the screen until a clearly focused image is formed on the screen.

• He measures the distance *u* between the object and the centre of the lens and the distance *v* between the centre of the lens and the screen. The readings are shown in Table 3.1.

(i) On Fig. 3.1, measure the distance *d* between the illuminated object and the screen.

d = ... [1]

(ii) Fig. 3.1 is drawn 1/10th actual size. Calculate the actual distance *D* between the illuminated object and the screen.

D = ... [1]

(b) Calculate, and record in Table 3.1, the focal length *f* of the lens using the equation $f = \frac{uv}{D}$. [1]

(c) • The student keeps the screen at the same fixed distance *D* from the illuminated object.

• He moves the lens slowly away from the screen. The image goes out of focus.

• He continues to move the lens slowly away from the screen until another clearly focused image is formed on the screen.

• He records the new readings of *u* and *v* in Table 3.1.

(i) Calculate, and record in Table 3.1 the new value for the focal length *f* of the lens using the equation $f = \frac{uv}{D}$. [1]

Table 3.1

u/cm	v/cm	f/cm
59.8	20.4	
19.8	60.0	

(ii) Calculate the average value f_A of the focal length of the lens. Give your answer to a suitable number of significant figures for this experiment.

f_A = ... cm [2]

(d) State **one** precaution that you would take to obtain accurate readings in this experiment.

....

.... [1]

(e) Another student wants to obtain more measurements for u and for v to check the value for the focal length f of the lens. The student moves the screen a distance of 40.0 cm to the right.

(i) Calculate the new value for the distance D between the illuminated object and the screen.

D = ... cm [1]

(ii) The student moves the lens to a new position which is a distance from the object u = 22.2 cm. He observes the image on the screen and says it is clearly focussed at a distance v = 97.9 cm.

Calculate the new value of the focal length f of the lens using $f = \frac{uv}{D}$.

f = ... cm [1]

(iii) State and explain briefly whether the values for f_A and f in **(e)(ii)** are the same within the limits of experimental accuracy.

....

....

.... [1]

[Total: 10]

4 A student investigates the time taken for ice cubes in a container to melt using different insulating materials on the container.

The following apparatus is available:

a copper container
a variety of insulating materials that can be wrapped round the copper container
a thermometer
a stopwatch
a supply of ice cubes

The student can also use other apparatus and materials that are usually available in a school laboratory.

Plan an experiment to investigate the time taken for ice cubes to melt using different insulating materials.

In your plan, you should:

- draw a diagram of the apparatus used
- explain briefly how you would carry out the investigation
- state the key variables that you would control
- 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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[Total: 7]

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