Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

9855181159

PHYSICS **0625/52**

Paper 5 Practical Test **October/November 2017**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of the page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
You are advised to spend about 20 minutes on each of questions 1 to 3, and about 15 minutes on question 4.
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.

For Examiner's Use	
1	
2	
3	
4	
Total	

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

This document consists of **10** printed pages and **2** blank pages.

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1 In this experiment, you will compare the oscillations of two pendulums. Carry out the following instructions, referring to Figs. 1.1 and 1.2.

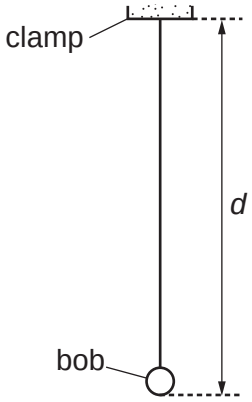


Fig. 1.1

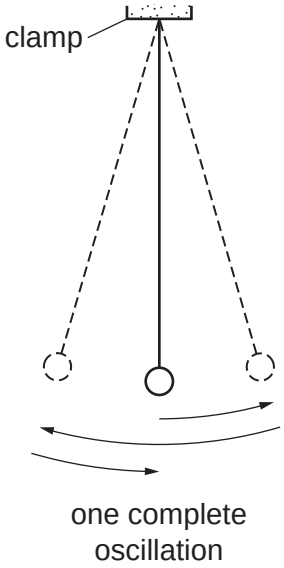


Fig. 1.2

A pendulum has been set up for you as shown in Fig. 1.1. This pendulum has a spherical pendulum bob.

(a) Adjust the pendulum until the distance *d* measured to the **bottom** of the bob is 50.0 cm.

Explain briefly how to use the set-square to avoid a parallax (line of sight) error when measuring the distance *d*. You may draw a diagram.

.....

.....[1]

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(b) Move the bob slightly to the side and release it so that it swings. Fig. 1.2 shows one complete oscillation of the pendulum.

(i) Measure the time t_1 for 20 complete oscillations.

t_1 = ...[1]

(ii) Calculate the period T_1 of the pendulum. The period is the time for one complete oscillation.

T_1 = ...[2]

(c) Remove the pendulum from the clamp and attach the second pendulum provided to the clamp. This has a long, thin bob. Adjust the pendulum until the distance d measured to the **bottom** of the bob is 50.0 cm.

Displace the bob slightly and release it so that it swings.

(i) Measure the time t_2 for 20 complete oscillations.

t_2 = ...[1]

(ii) Calculate the period T_2 of the pendulum.

T_2 = ...[1]

(d) A student suggests that the periods T_1 and T_2 should be equal.

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

statement .....

justification .....

.....

.....[2]

(e) The period *T* of a pendulum can be determined by measuring the time *t* for 20 complete oscillations and then calculating the period. Some students are asked to explain the reason for this method being more accurate than measuring the time taken for one oscillation.

Tick the box next to the sentence that gives the best explanation.

- ☐ The method eliminates errors from the measurements.
- ☐ The method is more accurate because the experiment is repeated.
- ☐ The method includes more readings so there is less chance for errors.
- ☐ The method reduces the effect of errors when starting and stopping the stopwatch.

[1]

(f) A student plans to carry out more pendulum experiments. He considers possible variables, and precautions to improve accuracy.

In the following list, mark the possible variables with the letter **V** and the precautions with the letter **P**.

- ☐ amplitude of swing
- ☐ length of pendulum
- ☐ mass of pendulum bob
- ☐ shape of pendulum bob
- ☐ use of a reference point to aid counting
- ☐ viewing the rule at right angles when measuring the length

[2]

[Total: 11]

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2 In this experiment, you will investigate the cooling of water.

(a) Measure room temperature θ_R.

θ_R = ...[1]

(b)
- Pour 50 cm^3 of the hot water provided into beaker **A**.
- Measure the temperature θ_H of the water in beaker **A**.

θ_H = ...

- Add 50 cm^3 of the cold water provided to the hot water in beaker **A**. Stir the water briefly.
- Measure the temperature θ_M of the water in beaker **A**.

θ_M = ...

- Calculate the temperature fall θ_F using the equation $\theta_F = \theta_H - \theta_M$.

θ_F = ...

- Empty beaker **A**. [3]

(c) Suggest **one** reason for stirring the water before reading θ_M.

.....

.....[1]

(d) Repeat the procedure in **(b)** using 75 cm^3 of hot water and 75 cm^3 of cold water.

θ_H = ...

θ_M = ...

θ_F = ...
[1]

(e) Repeat the procedure in **(b)** using 100 cm^3 of hot water and 100 cm^3 of cold water.

θ_H = ...

θ_M = ...

θ_F = ...
[1]

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(f) Measure room temperature θ_R again.

θ_R = ...

Complete the appropriate sentence.

- Room temperature has remained constant at ..... .
- Room temperature has decreased by ..... .
- Room temperature has increased by ..... .

[1]

(g) A student states that the temperature fall θ_F should be the same each time because the proportions of hot and cold water are the same.

Suggest a reason why θ_F could be very different in **(b)**, **(d)** and **(e)**.

.....

.....

.....[1]

(h) Suggest an improvement to the apparatus to make it more likely that θ_F would be the same each time.

.....

.....

.....[1]

(i) Suggest a condition, not included in your answer to **(h)**, that could be controlled to make it more likely that θ_F would be the same each time.

.....

.....

.....[1]

[Total: 11]

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3 In this experiment, you will determine the focal length *f* of a lens.

Carry out the following instructions referring to Fig. 3.1.

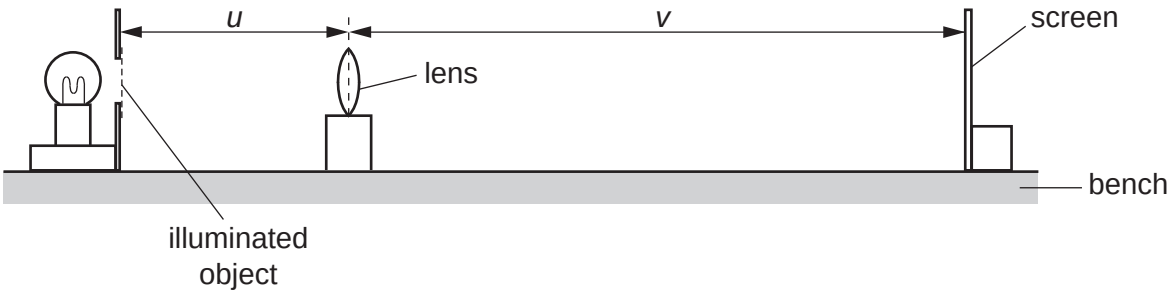


Fig. 3.1

(a) (i) Place the screen 100 cm from the illuminated object.

- Place the lens between the object and the screen so that the centre of the lens is at a distance *u* = 20.0 cm from the object.
- Adjust the position of the screen until a clearly focused image is formed on the screen.
- Measure the distance *v* between the centre of the lens and the screen. Record the values of *u* and *v* in Table 3.1.

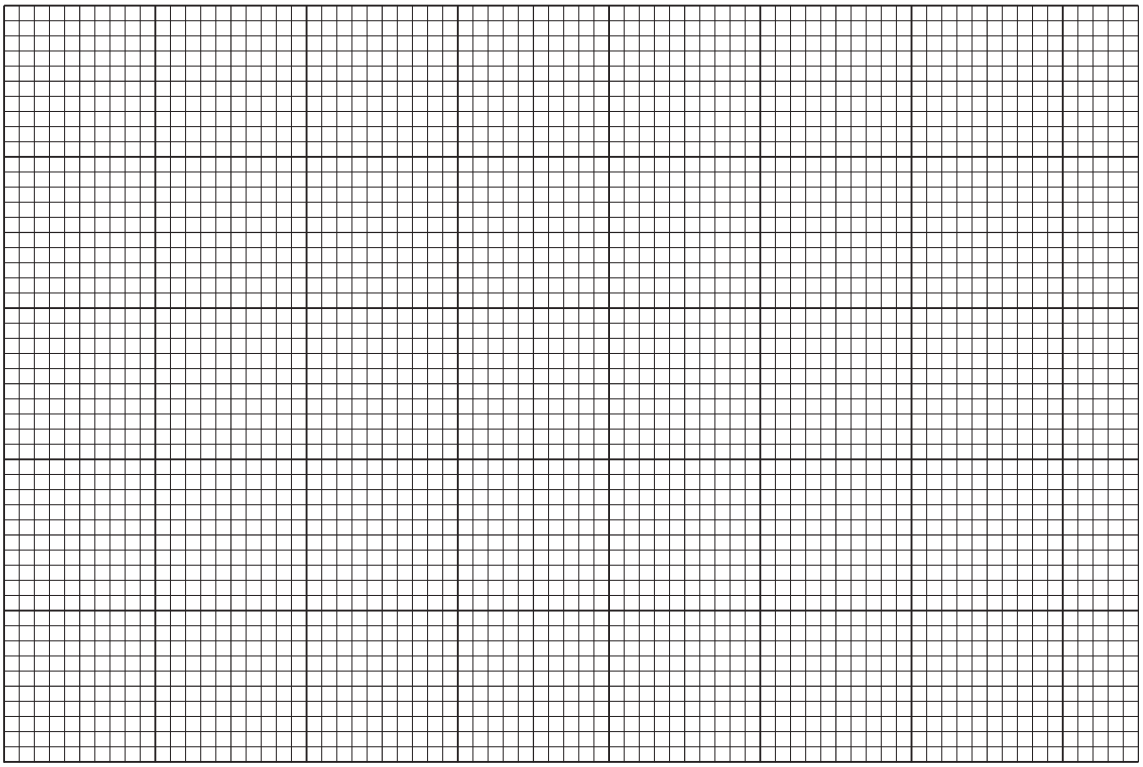
Table 3.1

u / cm	*v* / cm

(ii) Repeat the procedure using values for *u* of 22.0 cm, 25.0 cm, 30.0 cm and 35.0 cm. [3]

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(b) Plot a graph of v / cm (y-axis) against u / cm (x-axis). You do not need to start your axes at the origin (0, 0). Draw the best-fit curve.



[4]

(c) **(i)**
- Mark, with a cross, the point on the graph grid where u = 25.0 cm and v = 25.0 cm.
- Mark, with a cross, the point on the graph grid where u = 35.0 cm and v = 35.0 cm.
- Join these two points with a straight line. [1]

(ii)
- Record u_1, the value of u at the point where the straight line crosses your graph line.

u_1 = ... cm

- Record v_1, the value of v at the point where the straight line crosses your graph line.

v_1 = ... cm
[1]

(iii) Calculate the focal length f of the lens using the equation $f = \frac{(u_1 + v_1)}{4}$.

f = ... cm
[2]

[Total: 11]

4 A student has a selection of rubber bands of different thicknesses. He is investigating the amount of stretch produced by different loads. Fig. 4.1 shows the set-up used.

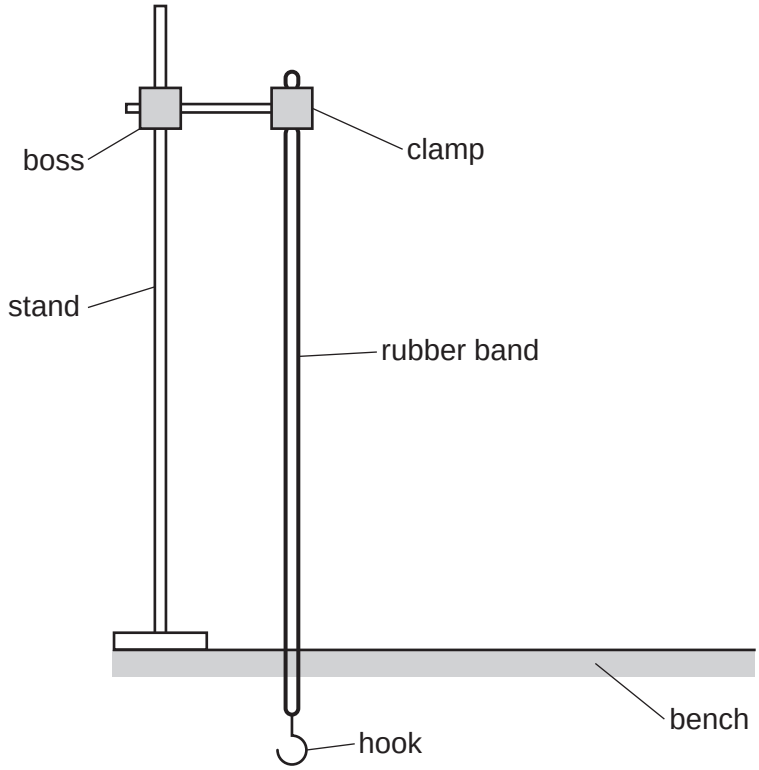


Fig. 4.1

In addition to the apparatus shown in Fig. 4.1, the following apparatus is available to the student:

metre rule
selection of different rubber bands
selection of loads.

Plan an experiment to investigate how rubber bands of different thicknesses stretch when loaded.

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

You should

- 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 briefly how you would use your readings to reach a conclusion.

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[Total: 7]

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