UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

PHYSICS **0625/52**

Paper 5 Practical Test **October/November 2013**

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 a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, 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.

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1	
2	
3	
4	
Total	

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

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International Examinations

[Turn over

1 In this experiment, you will investigate pendulums.

Carry out the following instructions, referring to Figs. 1.1 and 1.2.

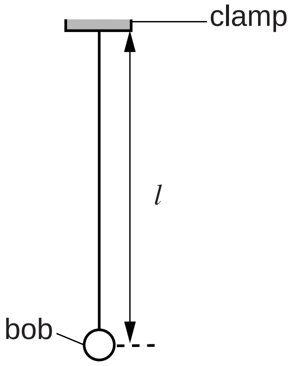

Fig. 1.1

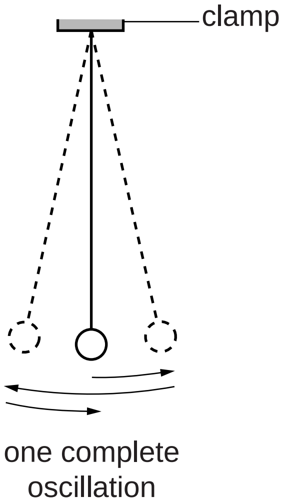

Fig. 1.2

A pendulum has been set up for you.

(a) Adjust the pendulum until its length l = 30.0 cm. The length l is measured to the centre of the bob.

(b) Displace the pendulum bob slightly from its vertical position and release it so that it swings. Measure and record in Table 1.1 the time t for 20 complete oscillations of the pendulum (see Fig. 1.2).

(c) Calculate the period T of the pendulum. The period is the time for one complete oscillation.

Record the value of T in the table.

(d) Adjust the length of the pendulum until its length l = 60.0 cm. Repeat steps **(b)** and **(c)**.

Table 1.1

l / cm	t / s	T / s
30.0		
60.0		

[4]

(e) A student suggests that doubling the length l of the pendulum should double the period T.

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

statement ....

justification ....

....

.... [2]

(f) Another student suggests that l should be directly proportional to T^2. The student plots a graph of l against T^2.

State two pieces of information from the graph that would indicate that l is directly proportional to T^2.

1. ....

2. .... [2]

(g) Remove the pendulum and replace it with the other pendulum provided. This pendulum has a mass that is double the mass of the first pendulum.

Adjust the length of the pendulum until its length l = 30.0 cm. Repeat steps **(b)** and **(c)**. Record the readings in Table 1.2.

Table 1.2

l / cm	t / s	T / s
30.0		

[1]

(h) Suggest a conclusion about the effect of doubling the mass of the pendulum.

....

.... [1]

[Total: 10]

2 In this laboratory investigation, you will investigate the cooling of water by four different methods.

You are provided with a supply of hot water.

Experiment A (cooling with **stirring**).

(a) **(i)** Pour approximately 200 cm^3 of the hot water supplied into beaker **1**. Place the thermometer in the beaker of water. When the thermometer reading stops rising, record the temperature θ_1.

θ_1 = ...

(ii) Start the stopclock and stir the water for one minute. Record the temperature θ_2 of the water.

θ_2 = ...

(iii) Calculate the temperature difference ($\theta_1 - \theta_2$).

($\theta_1 - \theta_2$) = ...

[3]

Experiment B (cooling with **pouring**).

(b) **(i)** Empty beaker **1**. Pour approximately 200 cm^3 of the hot water supplied into beaker **2**. Place the thermometer in the beaker of water. When the thermometer reading stops rising, record the temperature θ_3.

θ_3 = ...

(ii) Remove the thermometer. Carefully pour the water from beaker **2** into beaker **1**. Pour the water back into beaker **2**. Repeat this process **four** times.

(iii) Place the thermometer in the beaker of water. Record the temperature θ_4 of the water.

θ_4 = ...

(iv) Calculate the temperature difference ($\theta_3 - \theta_4$).

($\theta_3 - \theta_4$) = ...

[1]

Experiment C (cooling **with a lid**) and **Experiment D** (cooling **without a lid**).

(c) **(i)** Empty both beakers.

(ii) Pour approximately 200 cm^3 of the hot water supplied into beaker **1**. Place the thermometer in the beaker of water. When the thermometer reading stops rising, record the temperature θ_5.

θ_5 = ...

(iii) Pour approximately 200 cm^3 of the hot water supplied into beaker **2**. Place the thermometer in the beaker of water. When the thermometer reading stops rising, measure the temperature θ_6.

θ_6 = ...

(iv) Place the lid on beaker **1**. Start the stopclock. Allow both beakers to cool for 3 minutes.

(v) At the end of the 3 minute cooling period, record the temperature θ_7 of the water in beaker **1** and the temperature θ_8 of the water in beaker **2**.

θ_7 = ...

θ_8 = ...

(vi) Calculate the temperature difference $(\theta_5 - \theta_7)$.

$(\theta_5 - \theta_7)$ = ...

(vii) Calculate the temperature difference $(\theta_6 - \theta_8)$.

$(\theta_6 - \theta_8)$ = ...
[3]

(d) Rank the experiments in order with the one that produced the greatest temperature drop first.

greatest temperature drop 1. ....

2. ....

3. ....

smallest temperature drop 4. ....
[1]

(e) If this laboratory investigation is to be repeated many times to check the results, suggest one condition that should be kept constant in order to provide reliable results.

.... [1]

(f) A student complains that the investigation is not a fair comparison.

Suggest one way in which the investigation could be made more fair.

....

.... [1]

[Total: 10]

3 In this experiment, you will investigate the resistance of a wire.

Carry out the following instructions, referring to Fig. 3.1 which shows the circuit that has been set up for you.

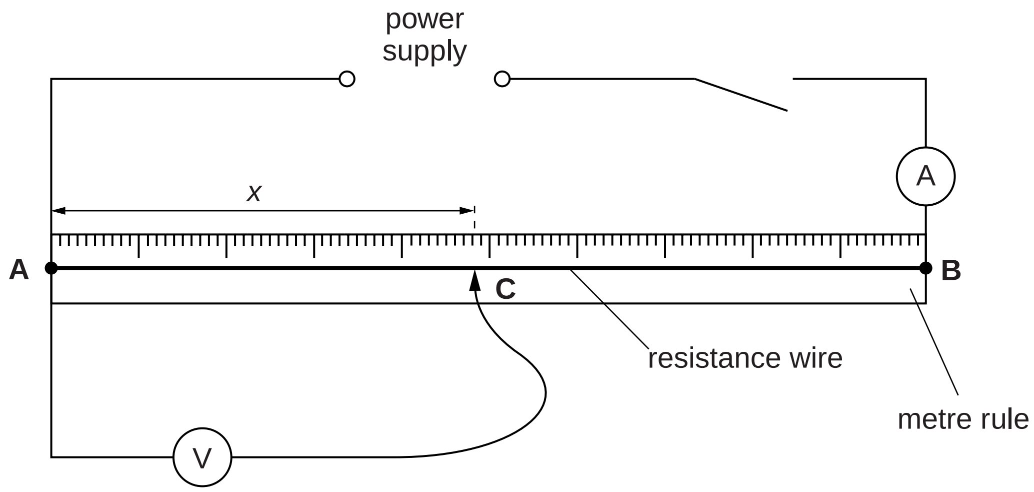

Fig. 3.1

You are provided with a length of resistance wire **AB**.

(a) **(i)** Place the sliding contact **C** on the resistance wire **AB** at a distance x from **A**, where x = 0.200 m.

(ii) Record the value of x in Table 3.1.

(iii) Switch on. Measure the potential difference V across the wire between **A** and **C**. Record the value of V in Table 3.1.

(iv) Measure the current I in the wire.

I = ... [1]

(v) Take the sliding contact away from the wire **AB** and switch off.

(vi) Calculate the resistance R of the section **AC** of the wire using the equation $R = \frac{V}{I}$.

Record R in Table 3.1.

Table 3.1

x / m	V / V	R / Ω

[3]

(b) Repeat the steps in **(a)** with the sliding contact at distances x = 0.350 m, 0.500 m, 0.650 m and 0.800 m from **A**.

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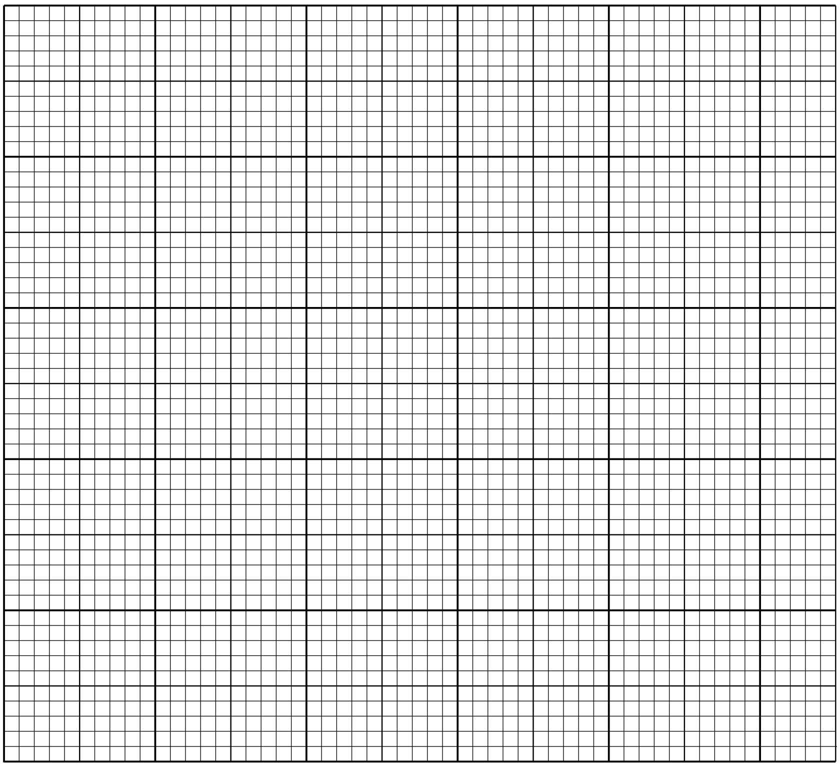
(c) Plot a graph of R / Ω (y-axis) against x / m (x-axis).



[4]

(d) Using your graph, determine the length l of the resistance wire necessary to make a resistor of resistance 1.2 Ω. Show clearly on your graph how you obtained the necessary information.

l = ... [1]

(e) Predict the resistance Z of 1.50 m of the resistance wire. Show your working.

Z = ... [1]

[Total: 10]

4 In this experiment, you will determine the focal length of a converging lens.

Carry out the following instructions, referring to Fig. 4.1.

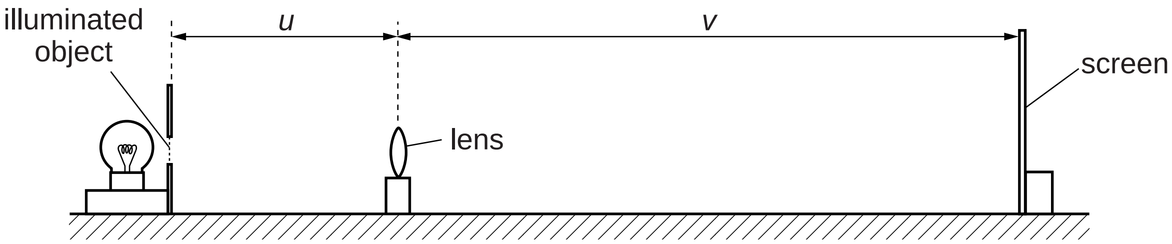


Fig. 4.1

(a) **(i)** Place the lens a distance u = 20.0 cm from the illuminated object.

Move the screen until a sharply focused image of the object is seen on the screen. The screen and the illuminated object must now remain in the same positions during the experiment.

(ii) Measure and record the distance v from the centre of the lens to the screen.

v = ... [1]

(iii) Calculate the value of uv.

uv = ...

(iv) Calculate the value of $(u + v)$.

$(u + v)$ = ...

(v) Calculate a value f_1 for the focal length of the lens, using the equation $f_1 = \dfrac{uv}{(u + v)}$.

f_1 = ...
[2]

(b) **(i)** Do not move the position of the screen or the illuminated object. Move the lens towards the screen until a smaller, sharply focused image of the object is seen on the screen.

(ii) Measure and record the distance v from the centre of the lens to the screen.

v = ...

(iii) Measure and record the distance u from the centre of the lens to the illuminated object.

u = ...

(iv) Calculate the value of uv.

uv = ...

(v) Calculate the value of $(u + v)$.

$(u + v)$ = ...
[1]

(vi) Calculate a second value f_2 for the focal length of the lens, using the equation $f_2 = \frac{uv}{(u + v)}$.

f_2 = ... [1]

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

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

statement ....

justification ....

....
[2]

(d) State two precautions that you could take in this experiment to obtain reliable results.

1. ....

....

2. ....

....
[2]

Question 4 continues on the next page

(e) Sketch a diagram of the image seen in part **(b)**.

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[1]

[Total: 10]

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