UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER		CANDIDATE NUMBER	

2371989261

PHYSICS **0625/62**

Paper 6 Alternative to Practical **October/November 2013**

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 a pencil for any diagrams or graphs.
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.

This document consists of **12** printed pages and **4** blank pages.

DC (CW/CGW) 66361/5

UNIVERSITY *of* CAMBRIDGE International Examinations

1 The IGCSE class is investigating pendulums.

The apparatus is shown in Figs. 1.1 and 1.2.

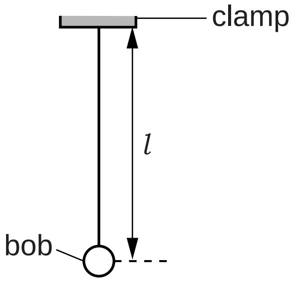

Fig. 1.1

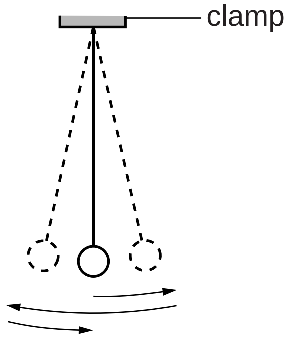

Fig. 1.2

(a) **(i)** On Fig. 1.1, measure the length l of the pendulum.

l = ... [1]

(ii) The pendulum is drawn 1/10th of actual size.

Write the actual length of the pendulum in the first row of Table 1.1.

(b) A student displaces the pendulum bob slightly and releases it so that it swings.

Fig. 1.2 shows one complete oscillation of the pendulum bob.

The student uses a stopwatch to record the time t for 20 complete oscillations of the pendulum. The reading is recorded in the table.

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

Record the value of T in Table 1.1.

(ii) Complete the column headings in the table.

Table 1.1

l / cm	t /	T /
	22.4	
61.9	31.6	1.58

[3]

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(c) The student adjusts the length of the pendulum until its length l = 61.9 cm. He repeats the procedure in **(b)** and calculates T. The results are shown in Table 1.1.

The student suggests that doubling the length l of the pendulum should double the period T.

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

statement ....

justification ....

....
[2]

(d) The student repeats the procedure in **(b)** four more times with different lengths of the pendulum.

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]

(e) The student uses another pendulum.

This pendulum has a mass that is double the mass of the first pendulum. Its length is 61.9 cm. The period T = 1.61 s.

Suggest a conclusion about the effect of doubling the mass of the pendulum.

....

.... [1]

[Total: 9]

2 The IGCSE class is investigating the cooling of water.

A student cools some water by four different methods.

Experiment A (cooling with stirring)

(a) The student pours approximately 200 cm^3 of hot water into a beaker.

She measures the temperature θ_1. Fig. 2.1 shows the thermometer.

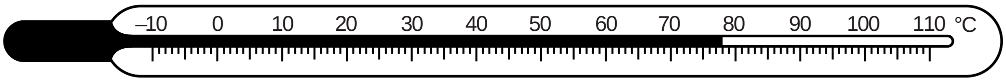

Fig. 2.1

Write down the temperature θ_1 shown on the thermometer in Fig. 2.1.

θ_1 = ... [1]

(b) The student stirs the water for one minute. She then records the temperature θ_2 of the water.

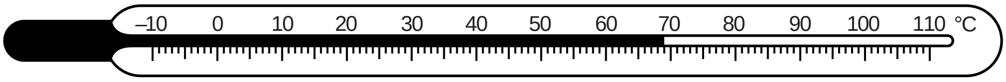

Fig. 2.2

(i) Write down the temperature θ_2 shown on the thermometer in Fig. 2.2.

θ_2 = ...

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

$(\theta_1 - \theta_2)$ = ...
[1]

Experiment B (cooling with pouring)

(c) The student starts again with approximately 200 cm^3 of hot water at the same initial temperature θ_1.

She carefully pours the water from the beaker into another beaker. She pours the water back into the first beaker. She repeats this process four times.

She measures the temperature θ_3 of the water. Fig. 2.3 shows this temperature.

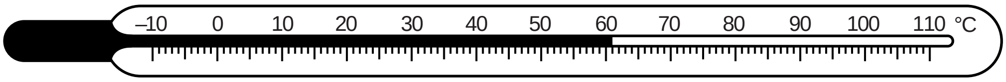

Fig. 2.3

(i) Write down the temperature θ_3 shown on the thermometer in Fig. 2.3.

θ_3 = ...

(ii) Calculate the temperature difference $(\theta_1 - \theta_3)$.

$(\theta_1 - \theta_3)$ = ... [1]

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

(d) The student pours approximately 200 cm^3 of the hot water into each of two beakers. The initial temperature of the water in each beaker is θ_1.

She places a lid on one of the beakers. She allows both beakers to cool for 5 minutes.

At the end of the cooling period, she calculates the temperature differences.

temperature difference of **C** (with a lid) = 11°C

temperature difference of **D** (without a lid) = 31°C

Rank the experiments **A**, **B**, **C** and **D** 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 two conditions that should be kept constant in order to provide reliable results.

1. ....

2. .... [2]

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

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

....

.... [1]

[Total: 7]

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3 The IGCSE class is investigating the resistance of a wire.

The circuit used is shown in Fig. 3.1.

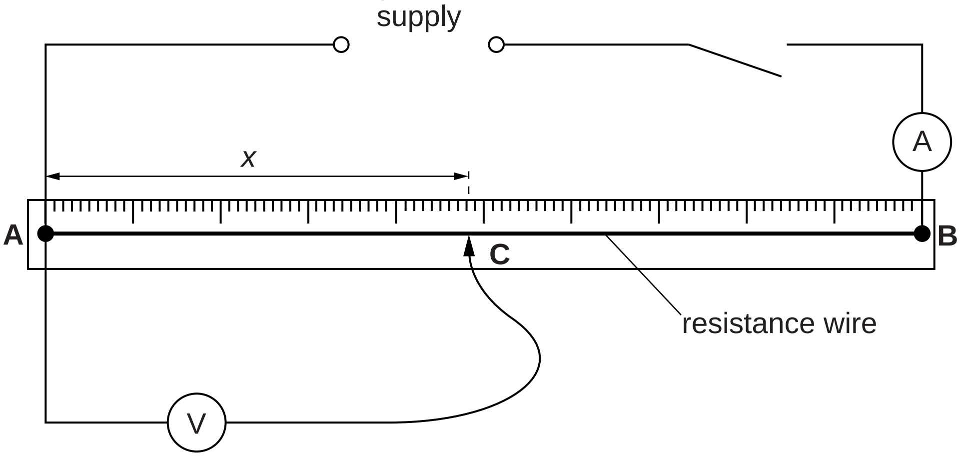

Fig. 3.1

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

(i) He measures the current *I* in the wire. Fig. 3.2 shows the ammeter.

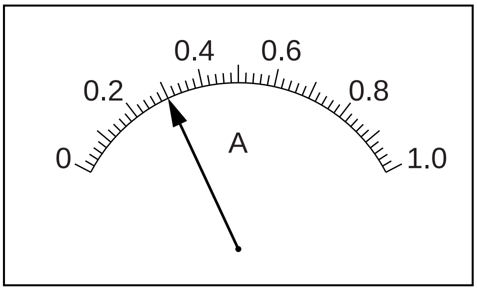

Fig. 3.2

Record the value of *I*.

I = ... [1]

(ii) The student measures the potential difference *V* across the wire between **A** and **C**. Fig. 3.3 shows the voltmeter.

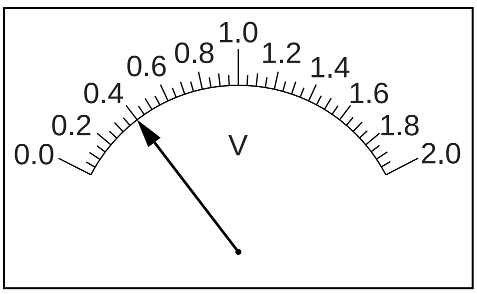

Fig. 3.3

In the first row of Table 3.1 record the value of *V*.

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

Record R in the first row of the table.

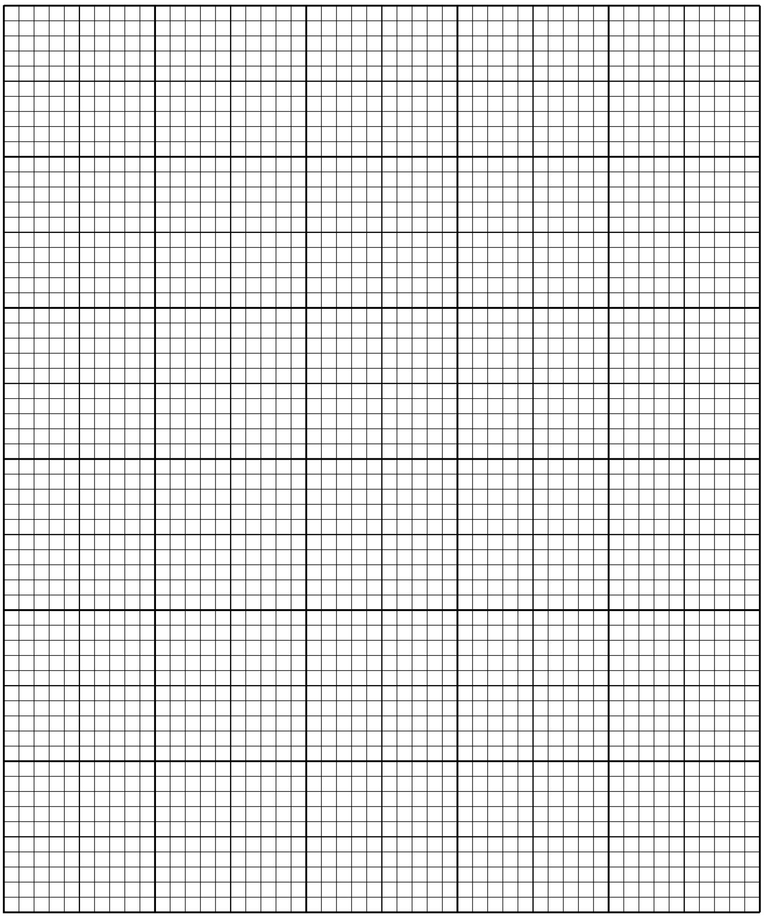
Table 3.1

x / m	V / V	R / Ω
0.200		
0.350	0.80	2.67
0.500	1.00	3.33
0.650	1.25	4.17
0.800	1.60	5.33

[2]

(b) The student records the voltmeter readings using a range of x values. The readings are shown in Table 3.1.

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



[5]

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(c) Using your graph, determine the length l of the resistance wire necessary to make a resistor of resistance 1.20 Ω. Show clearly on your graph how you obtained the necessary information.

l = ... [1]

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

Z = ... [1]

[Total: 10]

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For Examiner's Use

4 The IGCSE class is determining the focal length of a converging lens.

Fig. 4.1 shows the apparatus.

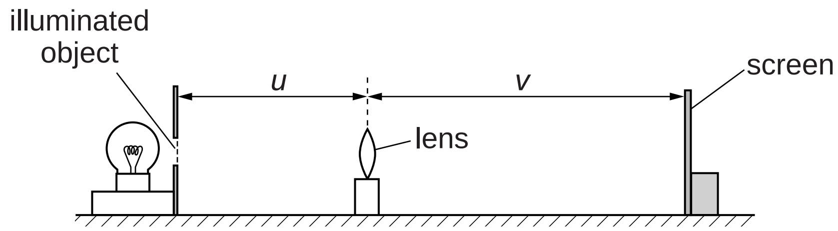

Fig. 4.1

(a) (i) On Fig. 4.1, measure and record the distance u, in mm, between the illuminated object and the lens.

u = ... mm

(ii) Measure and record the distance v, in mm, from the centre of the lens to the image on the screen.

v = ... mm
[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) A student does not move the position of the screen or the illuminated object. She moves the lens towards the screen until a smaller, sharply focused image of the object is seen on the screen.

The new values of u and v are

u = ...42 mm.................

v = ...25 mm.................

(i) Calculate the value of uv.

uv = ...

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

$(u + v)$ = ...

(iii) 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 the results support this suggestion. 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]

(e) The illuminated object is triangular, as shown in Fig. 4.2.

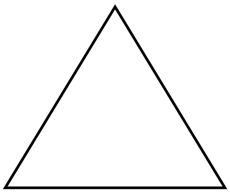

Fig. 4.2

Sketch the image you would see on the screen.

[1]

[Total: 9]

For Examiner's Use

5 The IGCSE class is investigating pressure.

A student places a rectangular block on a sheet of paper on the bench and draws the outline.

Fig. 5.1 shows the outline.

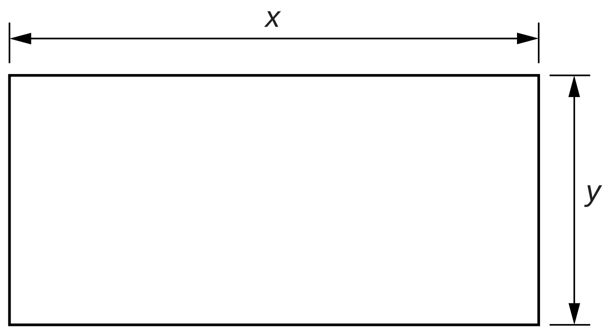

Fig. 5.1

(a) **(i)** On Fig. 5.1, measure the length *x* of the block.

x = ... [1]

(ii) On Fig. 5.1, measure the width *y* of the block.

y = ... [1]

(b) Fig. 5.2 shows the block being weighed using a forcemeter.

(i) Using Fig. 5.2, write down the weight *W* of the block.

W = ... [1]

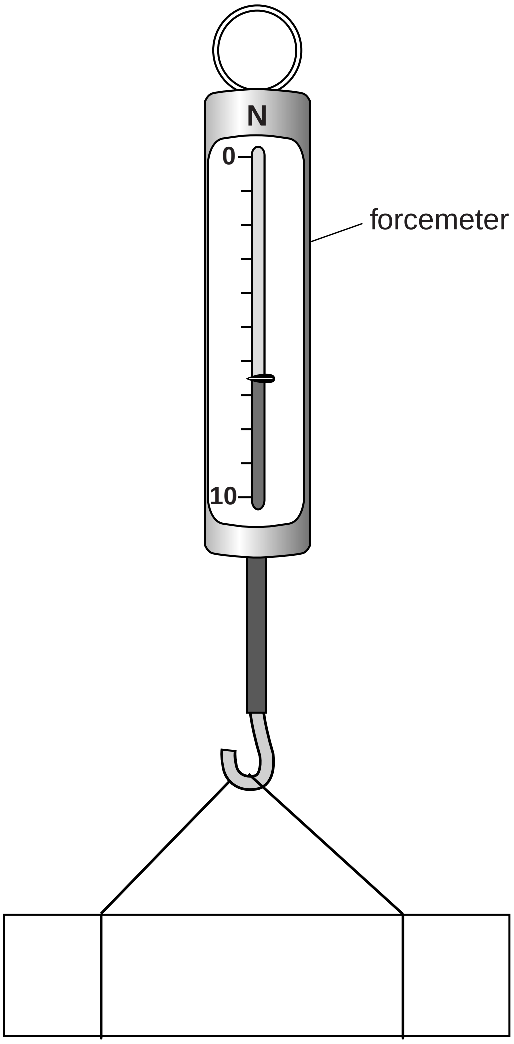

Fig. 5.2

(ii) Calculate the pressure P that the block exerts on the bench. Use the equation $P = \frac{W}{A}$ where A is the area of the block in contact with the bench ($A = xy$).

P = ... [1]

(c) The value calculated for P is slightly too small.

Suggest one practical source of inaccuracy that would account for this.

....

....[1]

[Total: 5]

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