**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

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|---|---|---|---|---|---|---|---|---|---|
| CANDIDATE NAME | | | | | | | | | |
| CENTRE NUMBER | | | | | | CANDIDATE NUMBER | | | | |

*4314503946*

**PHYSICS** **0625/53**

Paper 5 Practical Test **October/November 2014**

**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 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.

| 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 **12** printed pages.


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CAMBRIDGE International Examinations

**1** In this experiment, you will investigate the magnification produced by a converging lens.

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

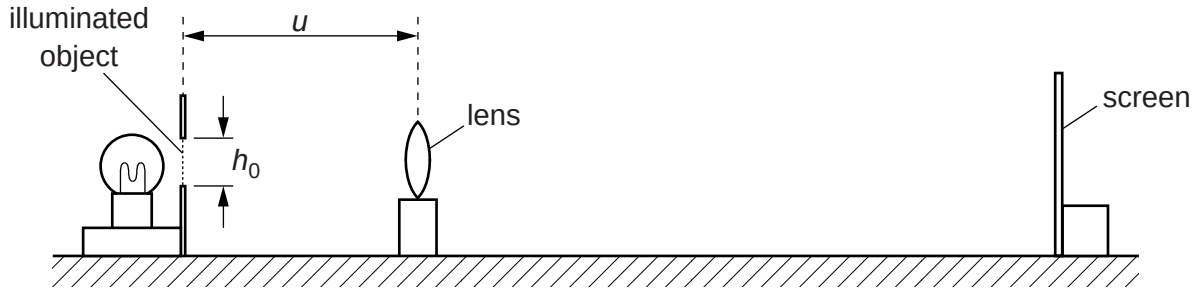



**Fig. 1.1**

**(a)** Measure and record the height $h_0$ of the triangular object.

$h_0$ = ..... cm

**(b)** **(i)** Switch on the lamp.

**(ii)** Set the distance $u$ between the illuminated object and the lens to 30.0 cm.

**(iii)** Move the screen until a sharp image of the illuminated object is seen.

**(iv)** Measure, and record in Table 1.1, the height $h_I$ of the image.

**Table 1.1**

| $u$/cm | $h_I$/cm | $S$ |
|---|---|---|
| 30.0 | | |
| 35.0 | | |
| 40.0 | | |
| 45.0 | | |
| 50.0 | | |
| 55.0 | | |

[3]

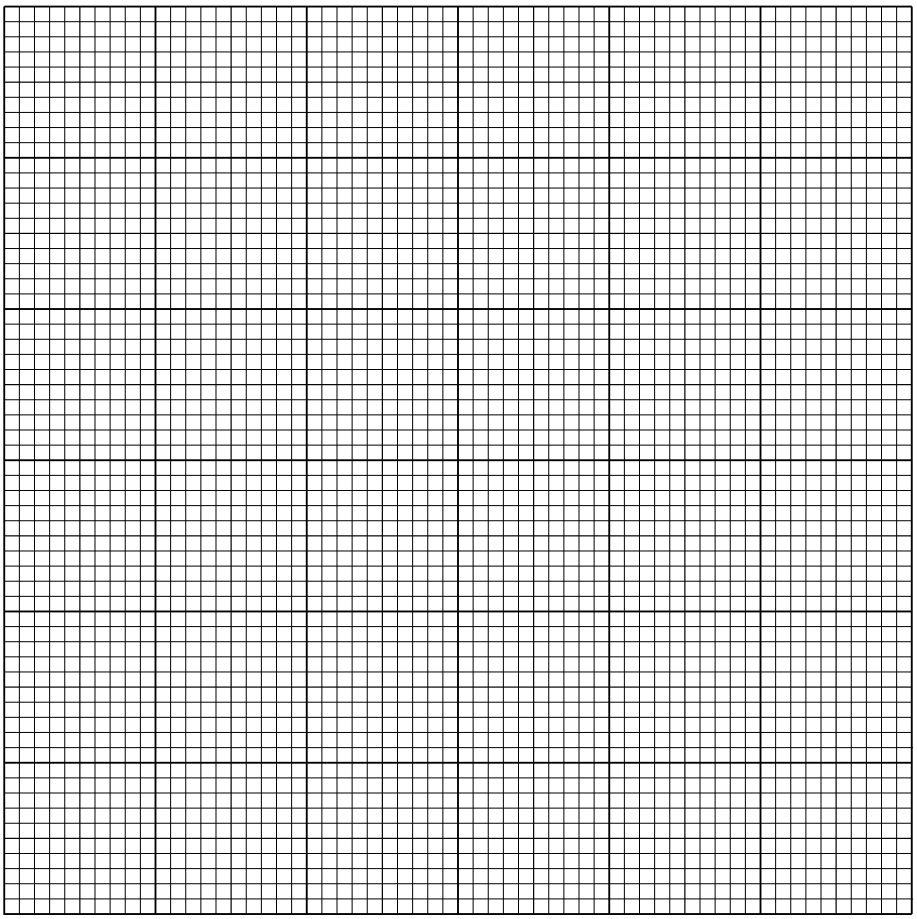
**(v)** Repeat **(b)(iii)** and **(b)(iv)** for $u$ values of 35.0 cm, 40.0 cm, 45.0 cm, 50.0 cm and 55.0 cm.

**(vi)** Switch off the lamp.

**(c)** For each distance $u$ calculate, and record in the table, a value $S$ using your results from **(a)** and **(b)** and the equation $S = \frac{h_0}{h_I}$.

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**(d)** Plot a graph of $S$ ($y$-axis) against $u$/cm ($x$-axis).



[5]

**(e)** **(i)** Determine the gradient $G$ of the graph.

Show clearly on the graph how you obtained the necessary information.

$G$ = ..... [1]

**(ii)** Calculate the focal length $f$ of the lens, where $f = \frac{1}{G}$ cm.

$f$ = ..... [1]

[Total: 10]

**2** In this experiment, you will investigate how the surface of a container affects the rate at which water cools.

Two test-tubes, labelled **A** and **B**, have been set up for you. Test-tube **A** has no covering. Test-tube **B** is covered with foil. Each test-tube has a mark to show the required water level.

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

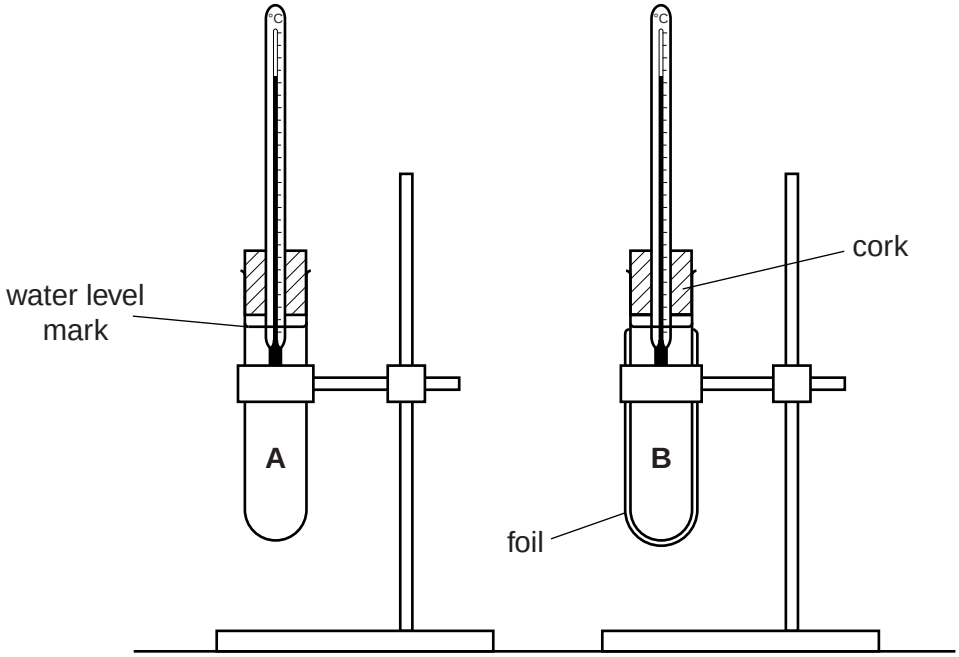



**Fig. 2.1**

**(a) (i)** Remove the cork and thermometer from test-tube **A**. Pour hot water into the test-tube, up to the mark.

**(ii)** Carefully replace the cork and thermometer. Wait for about 30 seconds before taking any measurements.

**(iii)** Start the stopclock and read the thermometer. In the first row of Table 2.1, record this temperature $\theta$ at time $t = 0$ s.

**(iv)** Record, in the table, the temperature $\theta$ of the thermometer at times $t$ = 30 s, 60 s, 90 s,120 s,150 s and 180 s.

**(v)** Complete the column headings and column $t$ values in the table.

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**Table 2.1**

| | test-tube **A** | test-tube **B** |
|---|---|---|
| $t$/ | $\theta$/ | $\theta$/ |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

[5]

**(b)** **(i)** Remove the cork and thermometer from test-tube **B**. Pour hot water into the test-tube, up to the mark.

**(ii)** Repeat steps **(a)(ii)** to **(a)(iv)**.

**(c)** State in which test-tube, **A** or **B**, the water cools at the greater rate. Justify your answer by referring to your results.

test-tube .....

justification .....

.....

.....

[2]

**(d)** Suggest one aspect of the practical procedure which may be a source of unreliability in the experiment.

.....

..... [1]

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**(e)** Another IGCSE student wants to extend your experiment in order to test the effects of other surface materials.

Suggest two factors relating to the apparatus which she should keep the same in order for the tests to be a fair comparison.

1. .....

.....

2. .....

.....

[2]

[Total: 10]

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**3** In this experiment, you will determine the resistance of a lamp in different electrical circuits.

Circuit 1 has been set up for you as shown in Fig. 3.1. Do not alter the connections of the lamp, voltmeter and ammeter between terminals **X** and **Y** during the whole experiment.

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

**circuit 1**

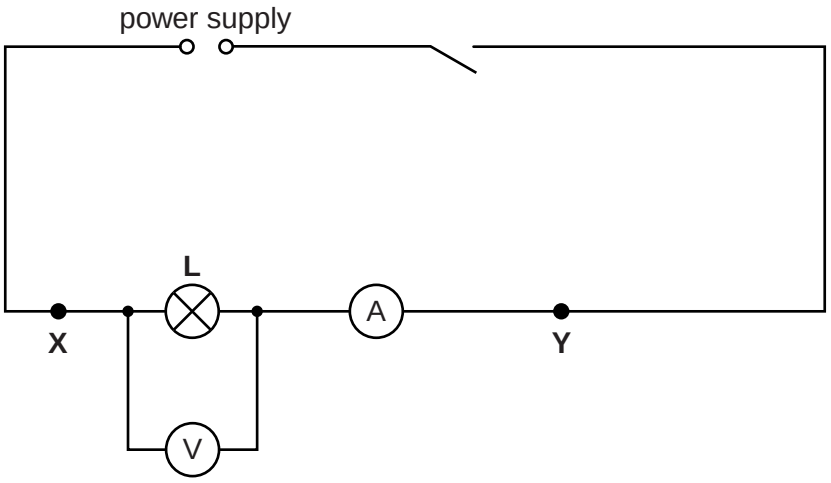



**Fig. 3.1**

**(a) (i)** Switch on. Measure, and record in Table 3.1, the potential difference *V* and the current *I* for lamp **L**. Switch off.

**Table 3.1**

| circuit | *V* / | *I* / | *R* / |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |

[6]

**(ii)** Calculate, and record in the table, the resistance *R* of lamp **L**, using the equation $R = \frac{V}{I}$.

**(iii)** Complete the column headings in the table.

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**(b) (i)** Disconnect terminal **Y** from the circuit. Use the extra lamps and leads which have been provided to connect circuit 2 as shown in Fig. 3.2.

**circuit 2**

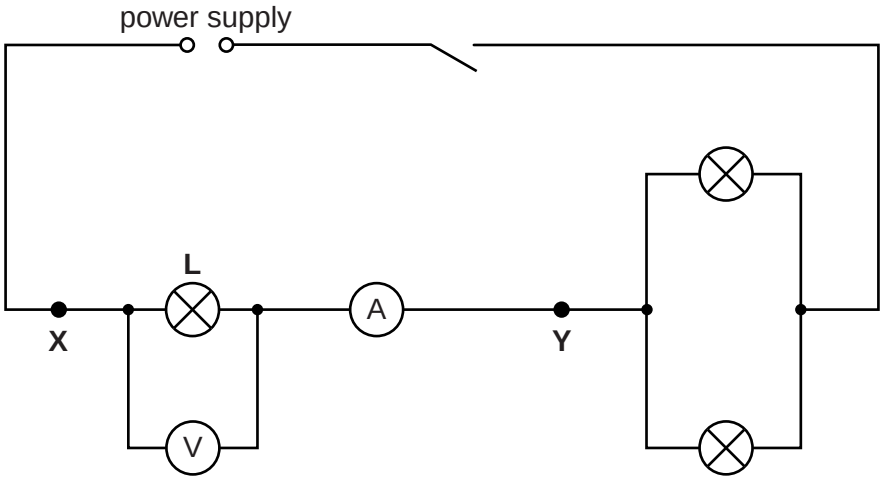



**Fig. 3.2**

**(ii)** Repeat steps **(a)(i)** and **(a)(ii)**.

**(c) (i)** Disconnect terminal **Y** from the circuit. Use the lamps and leads which have been provided to connect circuit 3 as shown in Fig. 3.3.

**circuit 3**

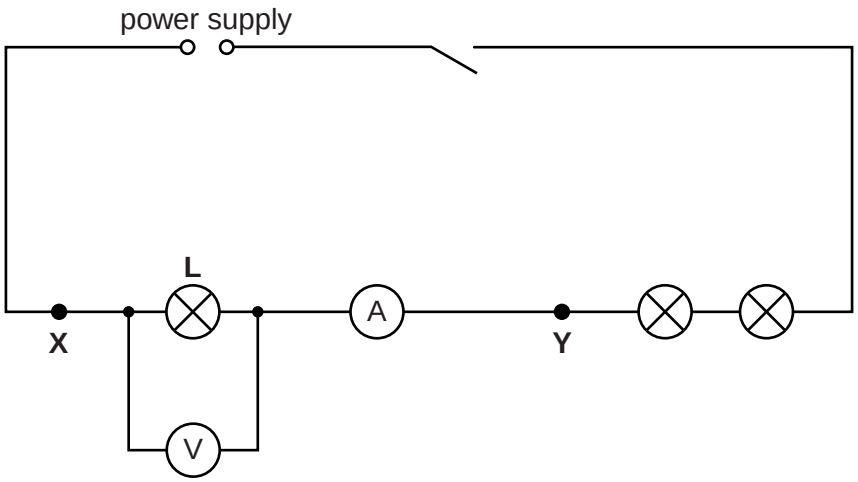



**Fig. 3.3**

**(ii)** Repeat steps **(a)(i)** and **(a)(ii)**.

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**(d)** A student suggests that, as the same lamp **L** is used throughout the experiment, its resistance in each circuit should be the same.

State whether your findings agree with this idea. Justify your answer by reference to your results.

statement .....

.....

justification .....

.....

.....
[1]

**(e)** Theory suggests that the resistance of a lamp increases if its temperature rises.

Explain whether or not your observations support this.

.....

.....

..... [1]

**(f)** It is possible to obtain sets of readings in this experiment by using a variable resistor rather than rearranging the circuit.

In the space below, redraw circuit 1 showing how a variable resistor could be included for this purpose.

[2]

[Total: 10]

**4** In this experiment, you will investigate the downward deflection of a metre rule clamped at one end.

The metre rule has been set up for you and you are provided with an object **M**. Carry out the following instructions, referring to Fig. 4.1.

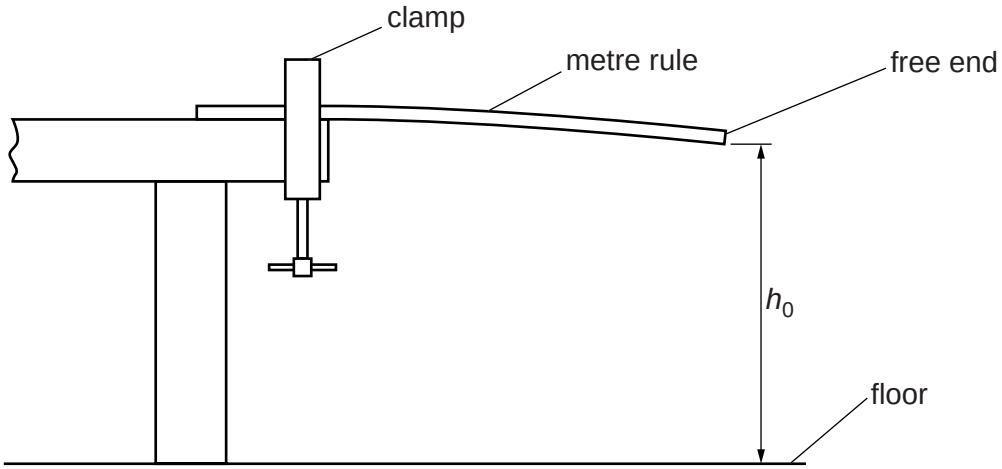



**Fig. 4.1**

**(a)** Measure and record the height $h_0$ of the free end of the metre rule above the floor as indicated in Fig. 4.1.

$h_0$ = ..... cm [1]

**(b)** Carefully place **M** on the rule at a distance $d$ = 60.0 cm from the free end of the rule, as shown in Fig. 4.2.

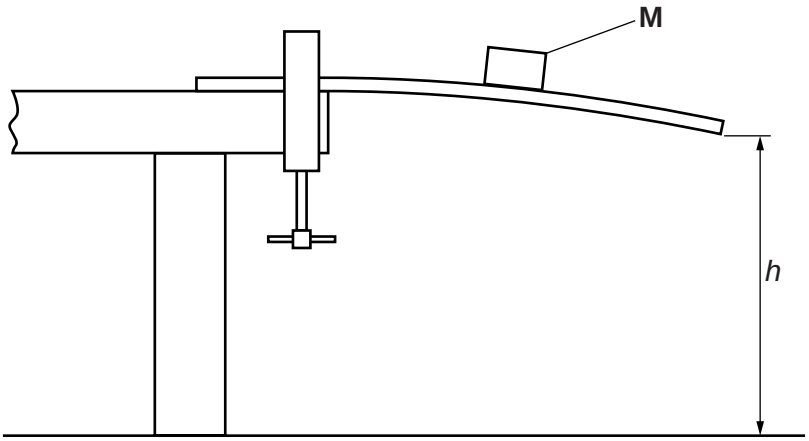



**Fig. 4.2**

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**(i)** Explain how you made sure that **M** was at the 60.0 cm mark. You may use a diagram.

.....

.....

..... [1]

**(ii)** Measure, and record in Table 4.1, the new height *h* of the free end above the floor, as indicated in Fig. 4.2.

**Table 4.1**

| $d$ / cm | $h$ / cm | $H$ / cm | $(d \times H)$ / $cm^2$ |
|---|---|---|---|
| 60.0 | | | |
| 50.0 | | | |
| 40.0 | | | |
| 30.0 | | | |
| 20.0 | | | |

[4]

**(iii)** Repeat **(b)(ii)** for $d$ = 50.0 cm, $d$ = 40.0 cm, $d$ = 30.0 cm and $d$ = 20.0 cm.

**(c) (i)** For each value of *d*, calculate and record in the table the downward deflection *H* (change in height) produced by **M**. Use your results from **(a)** and from the table and the equation $H = h_0 - h$.

**(ii)** For each value of *d*, calculate and record in the table the value of $(d \times H)$. Use your results from the table.

**(d)** A student suggests that *d* is inversely proportional to *H* (that is, *d* is proportional to $1/H$).

Using some appropriate figures from Table 4.1, explain why this cannot be the case.

.....

.....

..... [1]

**(e) (i)** When the metre rule is clamped in this way, the free end is slightly deflected downwards even before **M** is placed on it.

Explain why this deflection occurs.

.....

.....

..... [1]

**(ii)** Suggest how you could find the value of this deflection. You may draw a diagram.

.....

.....

..... [2]

[Total: 10]

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