Cambridge IGCSE

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

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

*4019313866*

**PHYSICS** **0625/52**

Paper 5 Practical Test **October/November 2018**

**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 | |

This 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 determine the spring constant *k* of a spring.

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

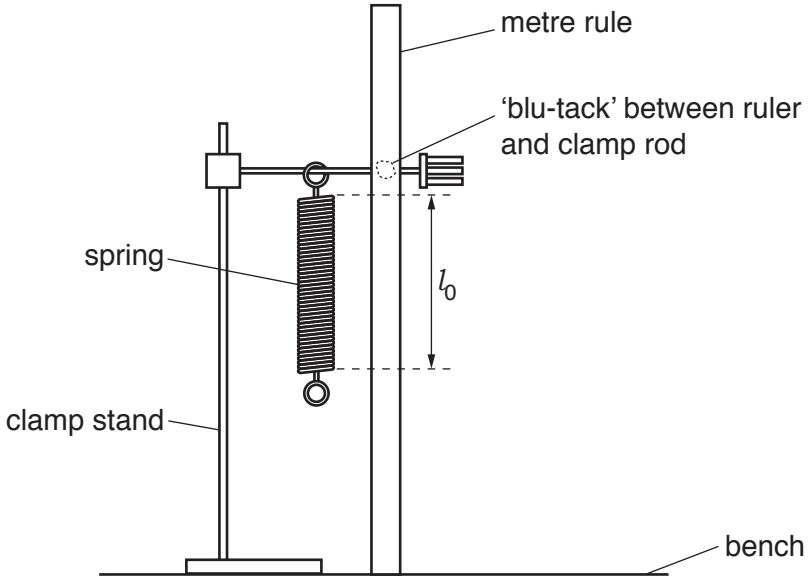



**Fig. 1.1**

**(a)** The metre rule is fixed in position close to the spring. **Do not change the position of the metre rule.**

**(i)** Use the set-square provided to take readings from the metre rule in order to determine the length $l_0$ of the coiled part of the spring.

Record of readings taken .....

.....[1]

**(ii)** Record in Table 1.1 the value of the length of the spring $l_0$ when the load *L* is 0.00 N. [1]

**(iii)**
- Place a load of 0.20 N on the spring. Record in Table 1.1 the new length $l$ of the spring.
- Use the equation $e = (l - l_0)$ to calculate the extension *e* of the spring. Record the value of *e* in the table.
- Repeat the procedure using loads of 0.40 N, 0.60 N, 0.80 N and 1.00 N. Record all the readings and results in the table.

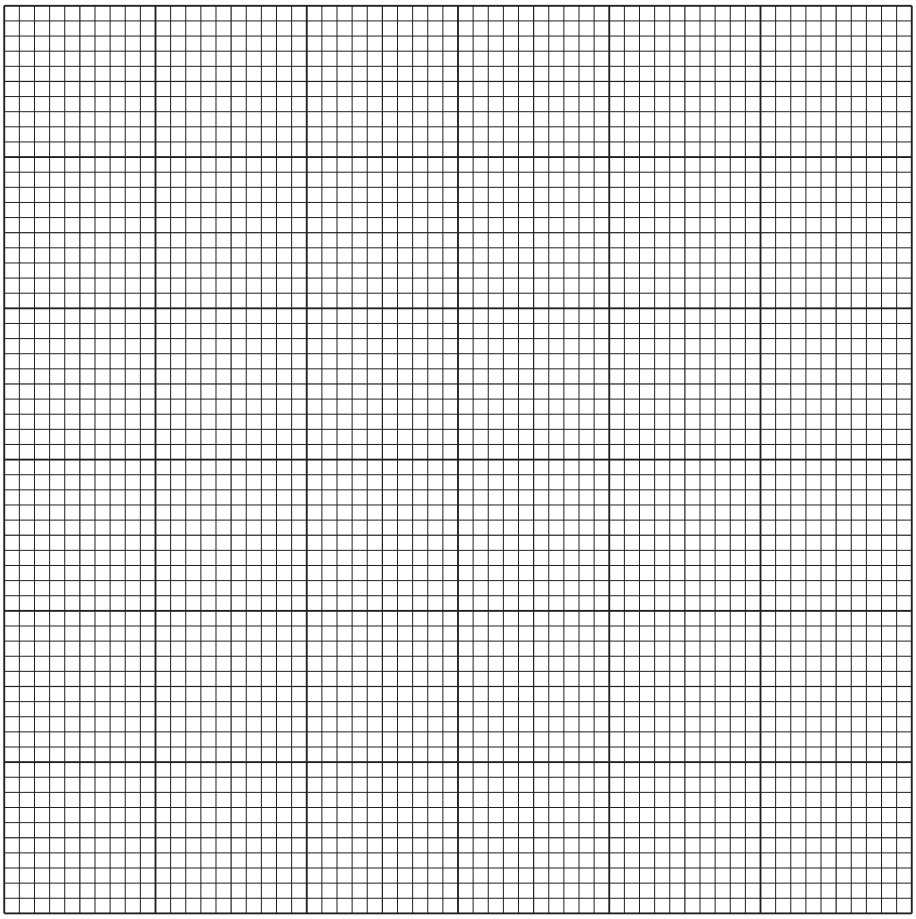
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**Table 1.1**

| $L$/N | $l$/mm | $e$/mm |
|---|---|---|
| 0.00 | | 0 |
| 0.20 | | |
| 0.40 | | |
| 0.60 | | |
| 0.80 | | |
| 1.00 | | |

[2]

**(b)** Plot a graph of $L$/N ($y$-axis) against $e$/mm ($x$-axis).



[4]

**(c)** Determine the gradient $G$ of the graph. Show clearly on the graph how you obtained the necessary information.

$G$ = .....[2]

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**(d)** The gradient $G$ is numerically equal to the spring constant $k$.

Write down a value for $k$ to a suitable number of significant figures for this experiment.

$k$ = ..... N / mm [1]

[Total: 11]

**2** In this experiment, you will investigate the power of lamps.

The circuit shown in Fig. 2.1 has been set up for you.

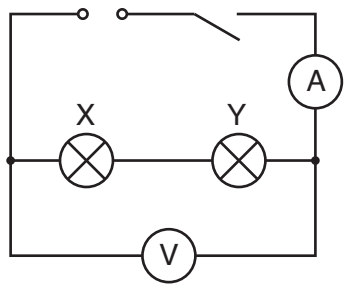



**Fig. 2.1**

**(a) (i)** Switch on.

Measure and record the potential difference (p.d.) $V_T$ across the lamps and the current $I_T$ in the circuit. Switch off.

$V_T$ = .....

$I_T$ = .....
[2]

**(ii)** Calculate the power $P_T$ produced by the lamp filaments, using the equation $P_T = V_T I_T$.

$P_T$ = .....[1]

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**(b)** Disconnect the voltmeter. Reconnect the voltmeter across lamp X. Switch on.

**(i)** Measure and record the potential difference (p.d.) $V_X$ across lamp X and the current $I_X$ in the circuit. Switch off.

$V_X$ = .....

$I_X$ = .....
[1]

**(ii)** Calculate the power $P_X$ produced by the lamp filament using the equation $P_X = V_X I_X$.

$P_X$ = .....[1]

**(c)** Disconnect the voltmeter. Reconnect the voltmeter across lamp Y. Switch on.

**(i)** Measure and record the potential difference $V_Y$ across lamp Y and the current $I_Y$ in the circuit. Switch off.

$V_Y$ = .....

$I_Y$ = .....
[1]

**(ii)** Calculate the power $P_Y$ produced by the lamp filament using the equation $P_Y = V_Y I_Y$.

$P_Y$ = .....[1]

**(d)** State and explain briefly whether your two values for power, $P_X$ and $P_Y$ are the same within the limits of experimental accuracy.

statement .....

explanation .....

.....
[2]

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**(e)** Draw a circuit diagram to show the circuit rearranged so that:

- the lamps are connected in parallel
- the ammeter will measure the total current in the circuit
- the voltmeter will measure the p.d. across the lamps.

You are **not** asked to set up this circuit.

[2]

[Total: 11]

**3** In this experiment, you will determine the refractive index *n* of the material of a transparent block.

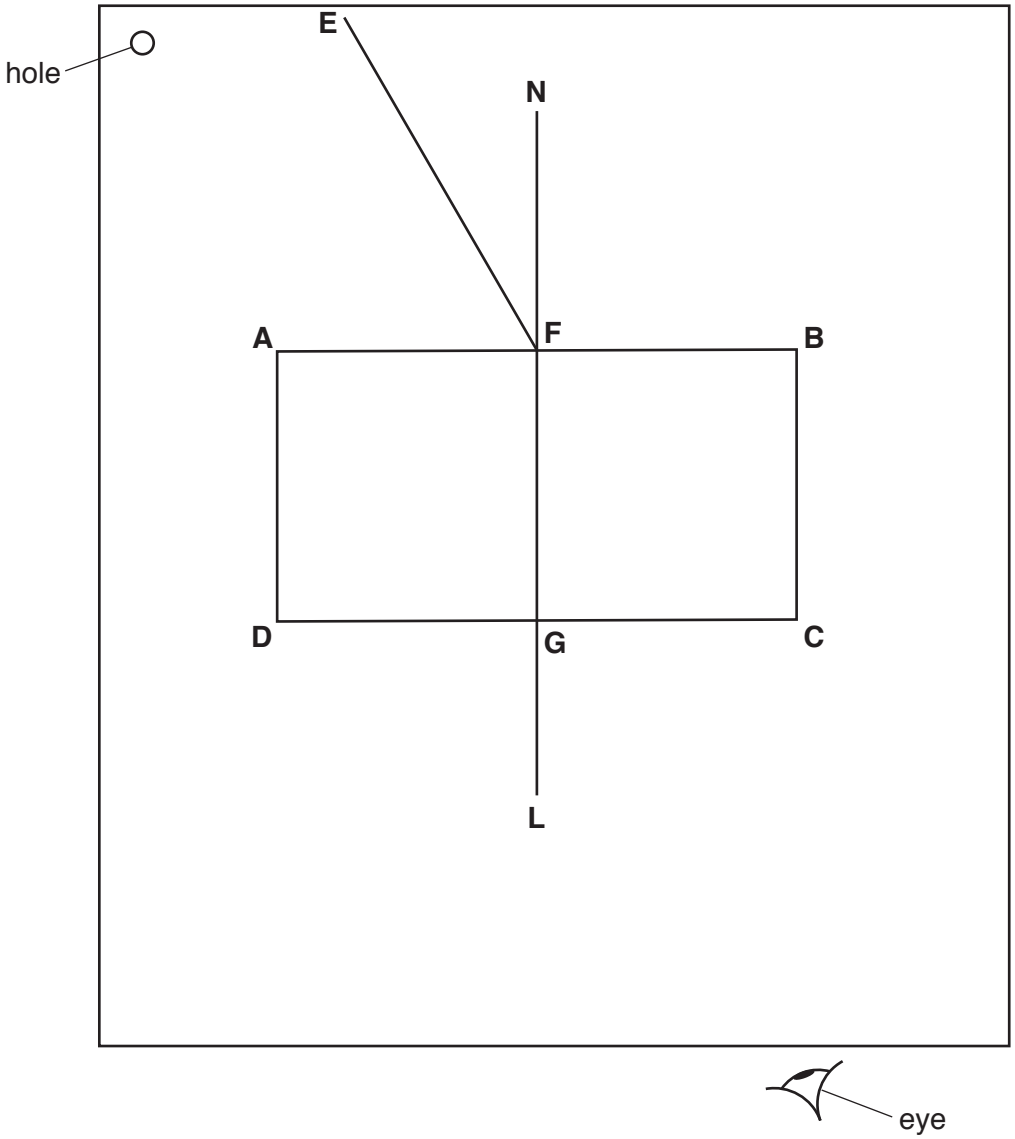



**Fig. 3.1**

**(a)** Carry out the following instructions, using the separate ray-trace sheet provided. Refer to Fig. 3.1 for guidance.

- Place the transparent block, largest face down, on the ray-trace sheet supplied. The block should be approximately in the middle of the paper.
- Draw and label the outline of the block **ABCD**.
- Remove the block and draw the normal **NL** at the centre of side **AB**. Continue the normal so that it passes through side **CD** of the block.
- Label the point **F** where **NL** crosses **AB**.
- Label the point **G** where **NL** crosses **CD**.

[2]

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**(b)**

- Draw the line **EF** at an angle $i = 30°$ to the normal as shown in Fig. 3.1.
- Place the paper on the pin board.
- Place two pins $P_1$ and $P_2$ on line **EF** at a suitable distance apart for this experiment.
- Replace the block and look from the position of the eye shown in Fig. 3.1, to observe the images of $P_1$ and $P_2$ through side **CD** of the block. Adjust your line of sight until the images of $P_1$ and $P_2$ appear one behind the other.
- Place two pins $P_3$ and $P_4$ between your eye and the block so that $P_3$, $P_4$, and the images of $P_1$ and $P_2$, seen through the block, appear one behind the other.
- Label the positions of $P_1$, $P_2$, $P_3$ and $P_4$.
- Remove the block and the pins.
- Draw a line joining the positions of $P_3$ and $P_4$. Continue the line until it meets the normal **NL**.
- Label the point **J** where the line meets the normal **NL**.
- Label the point **H** where the line meets side **CD**. Draw the line **FH**.

[1]

**(c) (i)** Measure and record the length *a* of the line **FH**.

*a* = .....[1]

**(ii)** Measure and record the length *b* of the line **HJ**.

*b* = .....[1]

**(iii)** Calculate the refractive index *n* using the equation $n = \frac{a}{b}$

*n* = .....[2]

**(d)** Repeat the procedure in **(b)** using the angle of incidence $i = 40°$.

**(i)** Repeat the measurements in **(c)** for $i = 40°$.

*a* = .....

*b* = .....
[1]

**(ii)** Calculate the refractive index *n* using the equation $n = \frac{a}{b}$

*n* = .....[1]

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**(e)** A student carries out this experiment with care and expects the two values of refractive index *n* obtained in this experiment to be equal.

State **two** difficulties with this type of experiment that could account for any difference in the two values of *n*.

1. .....

.....

2. .....

.....

[2]

[Total: 11]

**Tie your ray-trace sheet into this Question Booklet between pages 8 and 9.**

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**4** A student is investigating whether the type of container affects the time taken for water to be heated from room temperature to boiling point.

The following apparatus is available:

250 $cm^3$ copper can
250 $cm^3$ aluminium can
250 $cm^3$ glass beaker
Bunsen burner
measuring cylinder
thermometer
tripod and gauze
stopwatch

Other apparatus normally used in the school laboratory is also available.

Plan an experiment to investigate whether the type of container affects the time taken for water to be heated from room temperature to boiling point. You are **not** required to carry out this investigation.

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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**[Turn over**

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.....[7]

[Total: 7]

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