



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

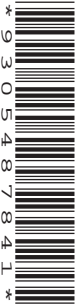
CANDIDATE  
NAME

CENTRE  
NUMBER

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**PHYSICS**

**0625/51**

Paper 5 Practical Test

**October/November 2012**

**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.

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.

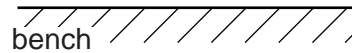
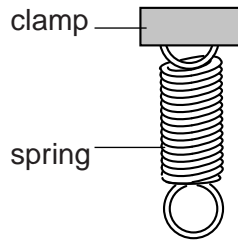
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1	
2	
3	
4	
<b>Total</b>	

This document consists of **9** printed pages and **3** blank pages.



- 1 In this experiment, you will investigate the stretching of a spring.

Carry out the following instructions, referring to Fig. 1.1. The spring has been set up for you. Do not change its position.



**Fig. 1.1**

- (a) (i) Measure the vertical distance  $d_0$ , in mm, between the bottom of the spring and the surface of the bench.

$d_0 = \dots\dots\dots$  mm

- (ii) On Fig. 1.1, mark clearly the distance you have measured.
- (iii) Hang a 1.0N load on the spring. Record the value of the load  $L$  in Table 1.1. Measure, and record in the table, the distance  $d$  between the bottom of the spring and the surface of the bench.
- (iv) Calculate the extension  $e$  of the spring using the equation  $e = (d_0 - d)$ . Record the value of  $e$  in the table.
- (v) Repeat steps (iii) and (iv) using loads of 2.0N, 3.0N, 4.0N and 5.0N. Record all the readings and results in the table.

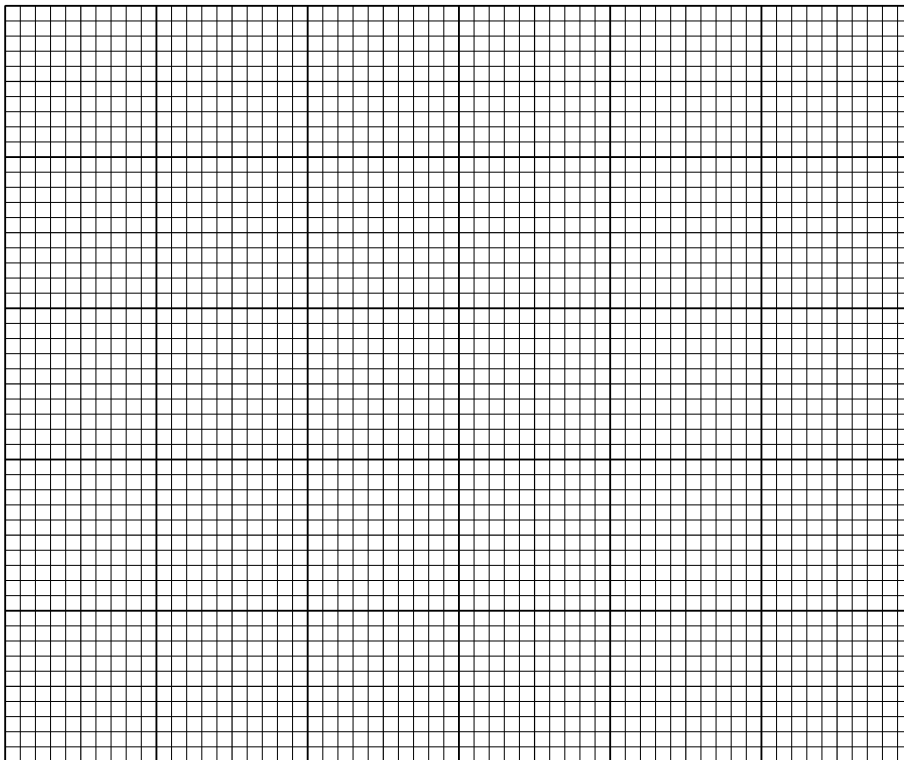
Table 1.1

$L/N$	$d/\text{mm}$	$e/\text{mm}$

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[4]

(b) Plot a graph of  $e/\text{mm}$  ( $y$ -axis) against  $L/N$  ( $x$ -axis).



[4]

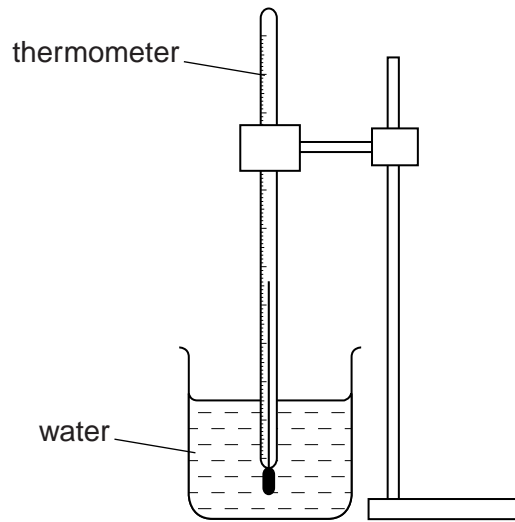
(c) Determine the gradient  $G$  of the graph. Show clearly on the graph how you obtained the necessary information.

$G = \dots\dots\dots$  [2]

[Total: 10]

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

You are provided with a supply of hot water. Carry out the following instructions, referring to Fig. 2.1.



**Fig. 2.1**

(a) Measure and record room temperature  $\theta_R$ .

$$\theta_R = \dots\dots\dots [1]$$

(b) (i) Pour  $150\text{ cm}^3$  of the hot water supplied into the measuring cylinder. Transfer the water from the measuring cylinder to the beaker.

(ii) Place the thermometer in the beaker of water.

(iii) Measure and record in the table the temperature of the water at 30s intervals until you have a total of six values up to time  $t = 150\text{ s}$ .

(c) Empty the beaker. Repeat step (b) using  $250\text{ cm}^3$  of hot water.

(d) Complete the column headings in Table 2.1.

**Table 2.1**

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	volume of water	
	150 cm <sup>3</sup>	250 cm <sup>3</sup>
<i>t/</i>	<i>θ/</i>	<i>θ/</i>
0		

[5]

- (e) State whether the rate of cooling is significantly faster, slower, or about the same when using the larger volume. Justify your answer by reference to your readings.

statement .....

justification .....

.....

.....

.....

[2]

- (f) If this experiment were to be repeated in order to check the results, it would be important to control the conditions. Suggest two such conditions that should be controlled.

1. ....

2. ....

[2]

[Total: 10]

- 3** In this experiment, you will investigate the potential differences across circuit components. The circuit is set up for you.

**(a)** Draw a circuit diagram of the circuit set up for you, using standard symbols.

[3]

- (b) (i)** Switch on. Measure and record the current  $I_A$ , and the potential difference  $V_L$  across lamp **L**. Switch off.

$$I_A = \dots\dots\dots$$

$$V_L = \dots\dots\dots$$

- (ii)** Disconnect the voltmeter and reconnect it across lamp **M**. Switch on.

Measure and record the potential difference  $V_M$  across lamp **M**. Switch off.

$$V_M = \dots\dots\dots$$

- (iii)** Calculate the potential difference across both lamps using the equation  $V_A = V_L + V_M$ .

$$V_A = \dots\dots\dots$$

- (iv)** Calculate the combined resistance  $R_A$  of the three lamps using the equation  $R_A = \frac{V_A}{I_A}$ .

$$R_A = \dots\dots\dots [3]$$

(c) Rearrange the circuit so that the three lamps are in **series** with each other.

- (i) Switch on. By connecting the voltmeter suitably each time, measure and record the potential difference across each lamp in turn. Switch off.

$$V_L = \dots\dots\dots$$

$$V_M = \dots\dots\dots$$

$$V_N = \dots\dots\dots$$

- (ii) Calculate the potential difference  $V_B$  across the three lamps using the equation  $V_B = V_L + V_M + V_N$ .

$$V_B = \dots\dots\dots$$

[2]

(d) A student suggests that  $V_A$  should be equal to  $V_B$ .

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

statement .....

justification .....

.....

.....

[2]

[Total: 10]

- 4 In this experiment, you will investigate the refraction of light passing through a transparent block.

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Use

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

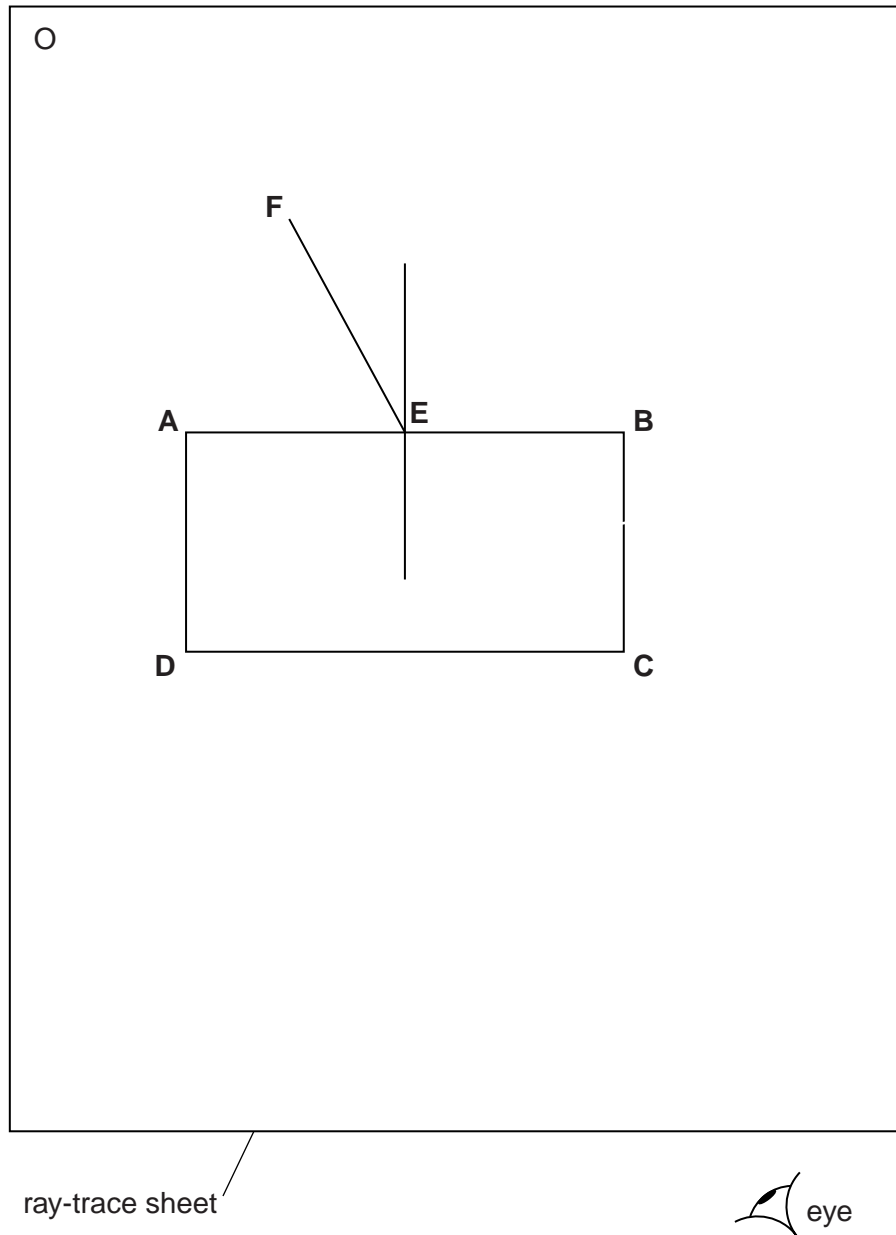


Fig. 4.1



- (a) 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 the outline of the block **ABCD**.
- (b) Remove the block and draw a normal at the centre of side **AB**. Label the point **E** where the normal crosses **AB**.
- (c) Draw a line **FE** to the left of the normal and at an angle of incidence  $i = 30^\circ$  to the normal as shown in Fig. 4.1.
- (d) Place two pins  $P_1$  and  $P_2$  on the line **FE**, placing one pin close to **E**. Mark the positions of  $P_1$  and  $P_2$ .
- (e) Replace the block and observe the images of  $P_1$  and  $P_2$  through side **CD** of the block, so that 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  $P_3$  and  $P_4$ , and the images of  $P_1$  and  $P_2$  seen through the block, appear one behind the other. Mark the positions of  $P_3$  and  $P_4$ . Remove the block.
- (f) Draw a line joining the positions of  $P_3$  and  $P_4$ . Continue the line until it meets **CD** and label this point **G**.
- (g) Draw the line **GE**.
- (h) Measure and record the angle of refraction  $r$  between the line **GE** and the normal.

$r = \dots\dots\dots$  [1]

- (i) Calculate the ratio  $\frac{i}{r}$ .

$\frac{i}{r} = \dots\dots\dots$  [1]

- (j) Repeat steps (c) – (i) but with the angle of incidence  $i = 40^\circ$ .

$r = \dots\dots\dots$

$\frac{i}{r} = \dots\dots\dots$  [2]

- (k) A student suggests that the ratio  $\frac{i}{r}$  should be a constant. State and explain briefly whether your results support this suggestion.

.....  
 .....  
 ..... [1]

**Tie your ray trace into this Booklet between pages 10 and 11.** [5]

[Total: 10]





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