UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

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.

For Examiner's Use	
1	
2	
3	
4	
Total	

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

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

For Examiner's Use

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

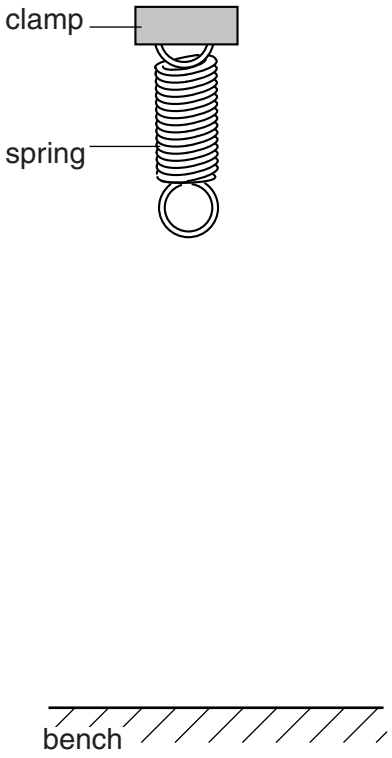


Fig. 1.1

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

d_0 = ...mm

(ii) On Fig. 1.1, mark clearly the distance you have measured.

(iii) Hang a 1.0 N 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 2.0 N, 3.0 N, 4.0 N and 5.0 N. Record all the readings and results in the table.

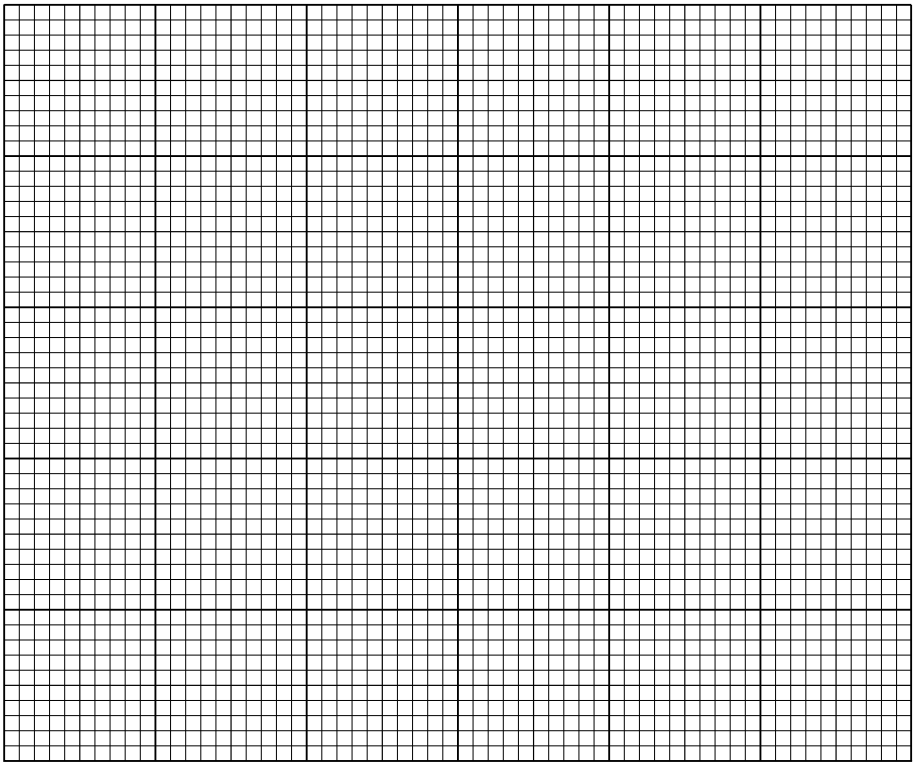
Table 1.1

For Examiner's Use

L/N	d/mm	e/mm

[4]

(b) Plot a graph of e/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 = ...[2]

[Total: 10]

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

For Examiner's Use

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

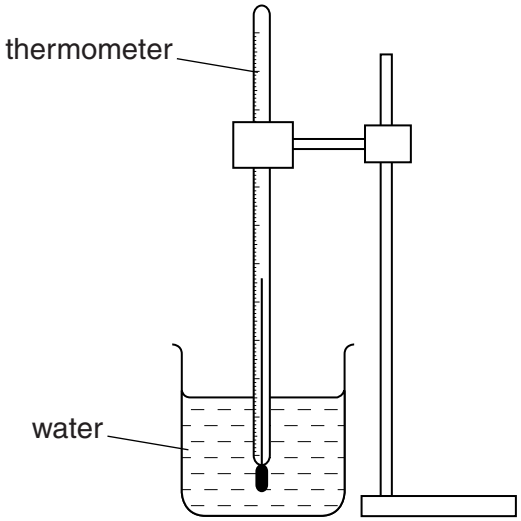


Fig. 2.1

(a) Measure and record room temperature θ_R.

θ_R = ...[1]

(b) (i) Pour 150 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 30 s intervals until you have a total of six values up to time t = 150 s.

(c) Empty the beaker. Repeat step **(b)** using 250 cm^3 of hot water.

(d) Complete the column headings in Table 2.1.

Table 2.1

For Examiner's Use

	volume of water	
	150 cm^3	250 cm^3
t/	θ/	θ/
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.

For Examiner's Use

(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 = ...

V_L = ...

(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 = ...

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

V_A = ...

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

R_A = ... [3]

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

For Examiner's Use

(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 = ...

V_M = ...

V_N = ...

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

V_B = ...
[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.

For Examiner's Use

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

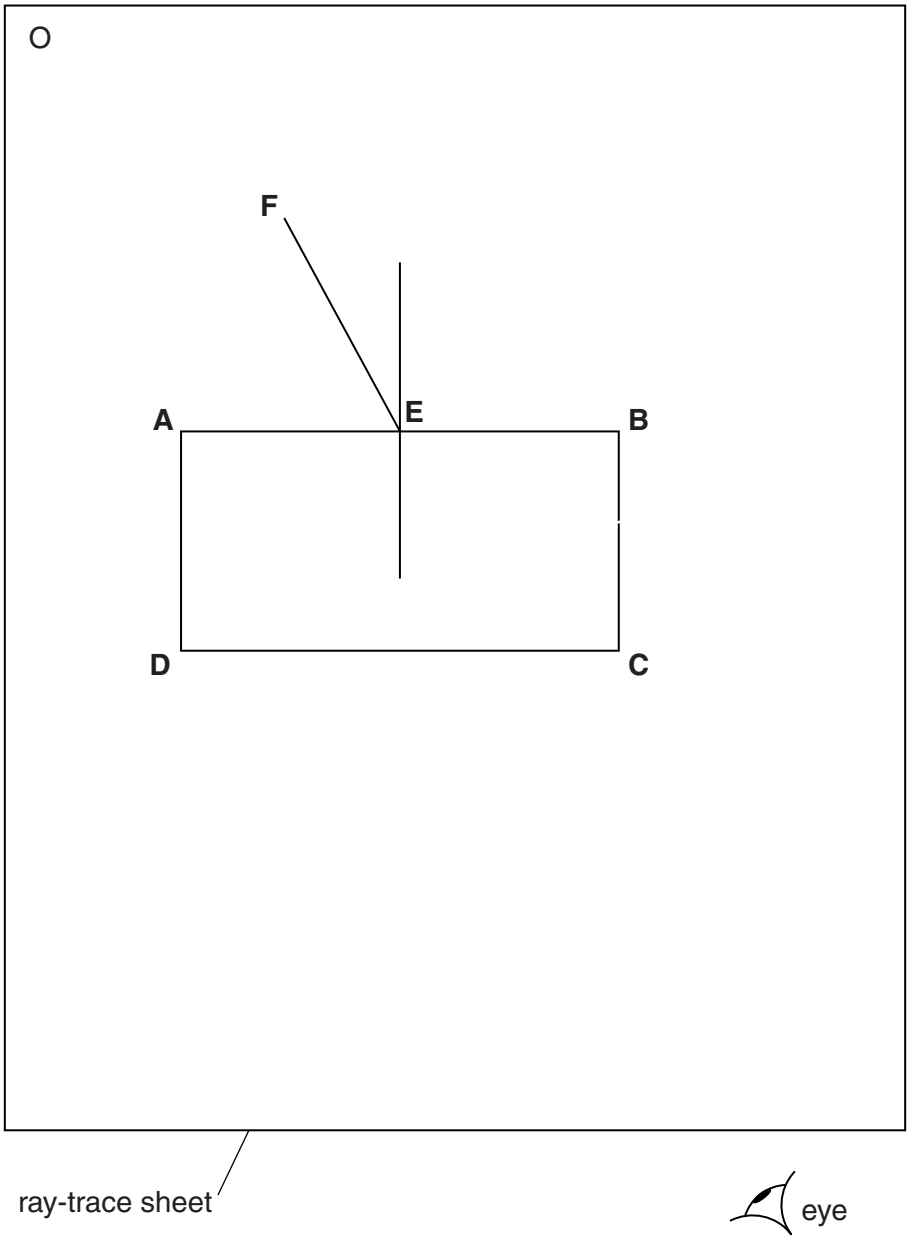


Fig. 4.1

For Examiner's Use

(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 $i = 30°$ 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.

$r =$ .....[1]

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

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

(j) Repeat steps **(c)** – **(i)** but with the angle of incidence $i = 40°$.

$r =$ .....

$\frac{i}{r} =$ .....[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]

BLANK PAGE

BLANK PAGE

BLANK PAGE