UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

5659002653

PHYSICS **0625/51**

Paper 5 Practical Test **May/June 2010**

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 **10** printed pages and **2** blank pages.

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1 In this experiment, you are to investigate the stretching of springs.

You have been provided with the apparatus shown in Fig. 1.1.

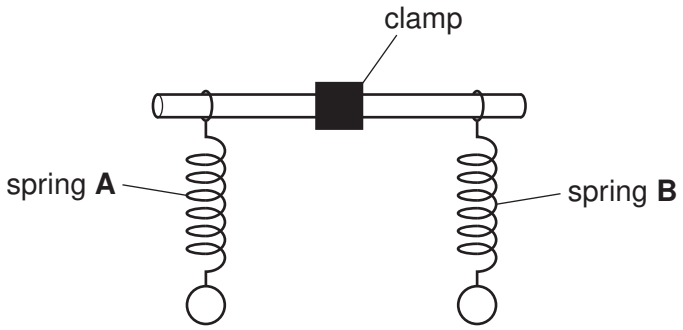

Fig. 1.1

(a) (i) Measure the length $l_{\mathbf{A}}$ of spring **A**.

$l_{\mathbf{A}}$ = ... mm

(ii) On Fig. 1.1 show clearly where you decided to start and end the length measurement $l_{\mathbf{A}}$.

(iii) Hang the 200 g mass on spring **A**. Measure the new length l of the spring.

l = ... mm

(iv) Calculate the extension $e_{\mathbf{A}}$ of spring **A** using the equation $e_{\mathbf{A}} = (l - l_{\mathbf{A}})$.

$e_{\mathbf{A}}$ = ... mm
[3]

(b) (i) Measure the length $l_{\mathbf{B}}$ of spring **B**.

$l_{\mathbf{B}}$ = ... mm

(ii) Hang the 200 g mass on spring **B**. Measure the new length l of the spring.

l = ... mm

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(iii) Calculate the extension e_B of spring **B** using the equation $e_B = (l - l_B)$

e_B = ... mm
[2]

(c) Use the small length of wooden rod provided to hang the 400 g mass midway between the springs as shown in Fig. 1.2.

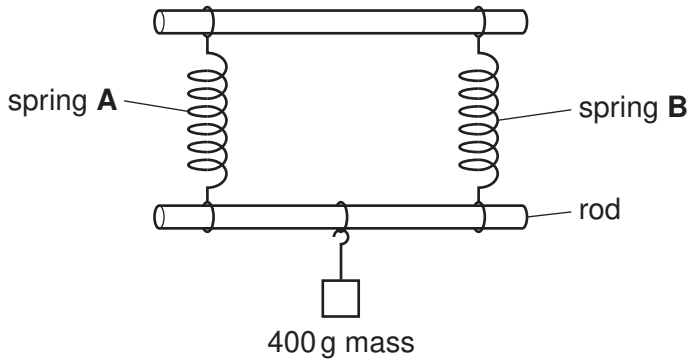

Fig. 1.2

(i) Measure the new lengths of each of the springs.

spring **A**: l = ... mm

spring **B**: l = ... mm

(ii) Calculate the extension of each spring using the appropriate equation from parts **(a)** and **(b)**.

spring **A**: e = ... mm

spring **B**: e = ... mm

(iii) Calculate the average of these two extensions e_{av}. Show your working.

e_{av} = ...mm
[2]

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(d) Theory suggests that $\frac{(e_{\mathbf{A}} + e_{\mathbf{B}})}{2} = e_{\text{av}}$.

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

Statement .....

Justification .....

..... [2]

(e) Describe briefly one precaution that you took to obtain accurate length measurements.

.....

.....

..... [1]

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2 In this experiment, you are to investigate the cooling of water.

Carry out the following instructions referring to Fig. 2.1.
You are provided with a beaker containing hot water and a thermometer.

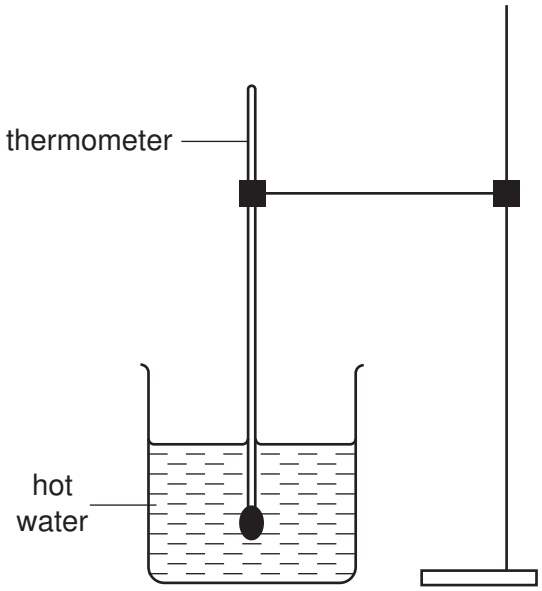

Fig. 2.1

(a) (i) Place the thermometer in the beaker of water. Measure the temperature θ of the water. Record θ in Table 2.1 at time $t = 0$ s.

(ii) Start the stopclock and record in Table 2.1 the temperature of the water at 30 s intervals until you have a total of six values up to time $t = 150$ s. Do not stop the stopclock, but take one final reading of the temperature of the water at time $t = 300$ s. Record this value in the table.

Table 2.1

t / s	θ / °C
0	
30	
60	
90	
120	
150	
300	

[2]

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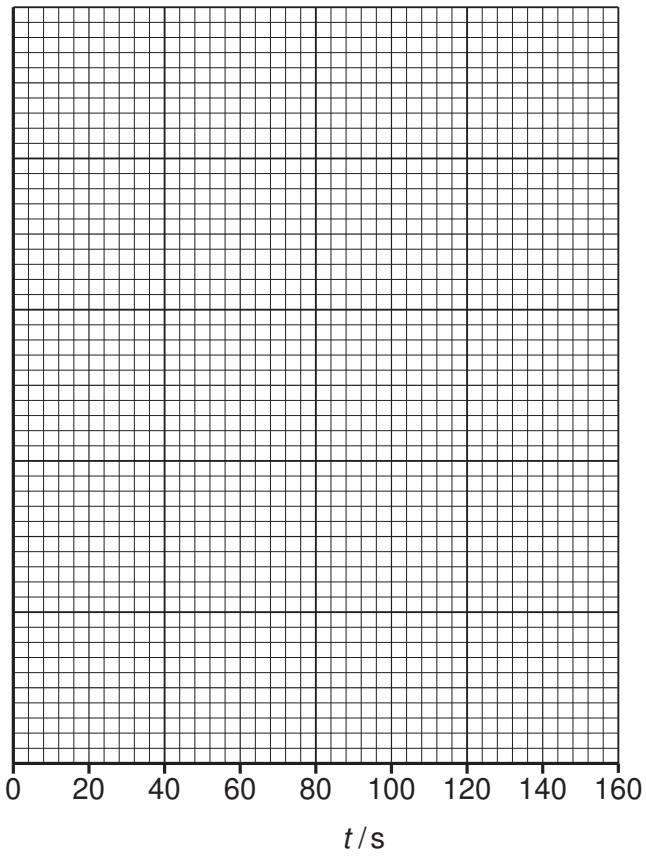
(b) (i) Using the information in the table, calculate the temperature change T_1 of the water in the first 150 s.

T_1 = ...

(ii) Using the information in the table, calculate the temperature change T_2 of the water in the final 150 s.

T_2 = ... [3]

(c) Plot a graph of θ / °C (y-axis) against t/s (x-axis) for the first 150 s. [5]



3 In this experiment, you will investigate the effect of the length of resistance wire in a circuit on the potential difference across a lamp.

The circuit has been set up for you.

(a) Fig. 3.1 shows the circuit without the voltmeter. Draw on the circuit diagram the voltmeter as it is connected in the circuit. [2]

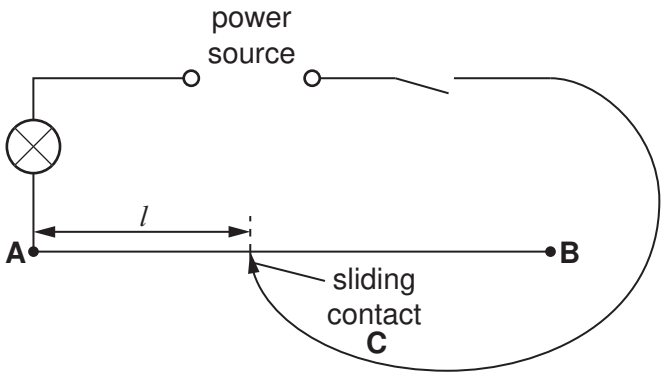


Fig. 3.1

(b) (i) Switch on and place the sliding contact **C** on the resistance wire at a distance l = 0.150 m from end **A**. Record the value of l and the potential difference V across the lamp in Table 3.1. Switch off.

(ii) Repeat step **(i)** using the following values of l: 0.350 m, 0.550 m, 0.750 m and 0.950 m. Record all the values of l and V in Table 3.1.

Table 3.1

l / m	V / V	$\frac{V}{l}$ /

(iii) For each pair of readings in the table calculate and record in the table the value of $\frac{V}{l}$.

(iv) Complete the table by writing in the unit for $\frac{V}{l}$. [5]

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(c) A student suggests that the potential difference V across the lamp is directly proportional to the length l of resistance wire in the circuit. State whether or not you agree with this suggestion and justify your answer by reference to your results.

Statement .....

Justification .....

..... [2]

(d) State one precaution that you would take in order to obtain accurate readings in this experiment.

.....

.....

..... [1]

4 In this experiment, you are to investigate reflection from a plane mirror.

Carry out the following instructions referring to Fig. 4.1.

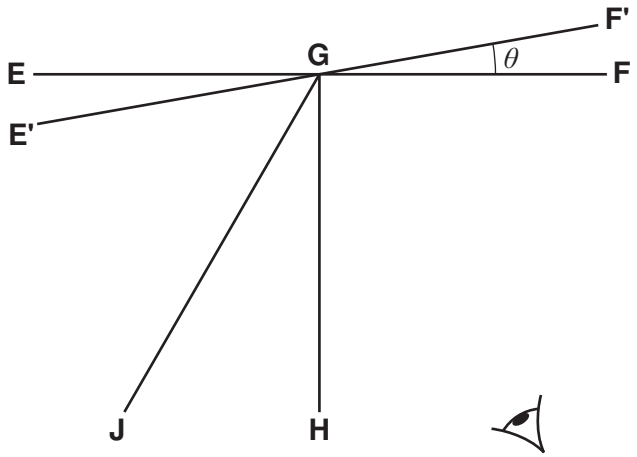

Fig. 4.1

(a) Draw a straight line **EF** across the ray trace sheet, about 10 cm from the top of the sheet.

(b) Draw a normal **GH** to line **EF** so that point **G** is approximately at the centre of line **EF**.

(c) Draw a line **GJ** at an angle of incidence $i = 30°$ to the normal as shown in Fig. 4.1.

(d) Place the ray trace sheet on the pin board. Place the mirror so that it stands along the line **EF**.

(e) Push a pin P_1 into the surface at a point on **GJ** close to the mirror. Label this point **A**.

(f) Push another pin P_2 into the surface on **GJ** some distance from the mirror. Label this point **B**.

(g) View the images of the pins P_1 and P_2 from the direction indicated by the eye in Fig. 4.1. Push two pins P_3 and P_4 into the surface between your eye and the mirror so that P_3, P_4 and the images of P_1 and P_2 appear exactly in line.

(h) Mark the positions of pins P_3 and P_4 on the ray trace sheet with letters **C** and **D**. Remove the pins and the mirror. Using a rule, draw a line joining **C** and **D**, and continue this line to meet the line **EF**.

(i) Measure the angle of reflection r_1 between lines **GH** and **CD**.

r_1 = ... [1]

(j) Draw a line **E'GF'** such that the angle θ between this line and the line **EGF** is 10°. (See Fig. 4.1). Place the mirror so that it stands along the line **E'F'**.

(k) Push the pins P_1 and P_2 into the ray trace sheet at the same points **A** and **B** used previously.

(l) Repeat step **(g)**.

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(m) Mark the positions of pins P_3 and P_4 on the ray trace sheet with letters **C'** and **D'**. Remove the pins and the mirror. Using a rule, draw a line joining **C'** and **D'**, and continue this line to meet the line **E'F'**.

(n) **(i)** Measure the angle r_2 between lines **GH** and **C'D'**.

r_2 = ...

(ii) Calculate the angle α through which the reflected ray has moved.

α = ...

(iii) Calculate the difference between 2θ and α.

difference between 2θ and α = ... [2]

(o) Theory suggests that if the mirror is moved through an angle θ then the reflected ray will move through an angle of 2θ. State whether your result supports the theory and justify your answer by reference to the result.

Statement .....

Justification .....

..... [2]

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

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