UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

PHYSICS **0625/52**

Paper 5 Practical Test **May/June 2011**

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.

UNIVERSITY *of* **CAMBRIDGE**
International Examinations

[Turn over

1 In this experiment you will investigate the loading of a metre rule.

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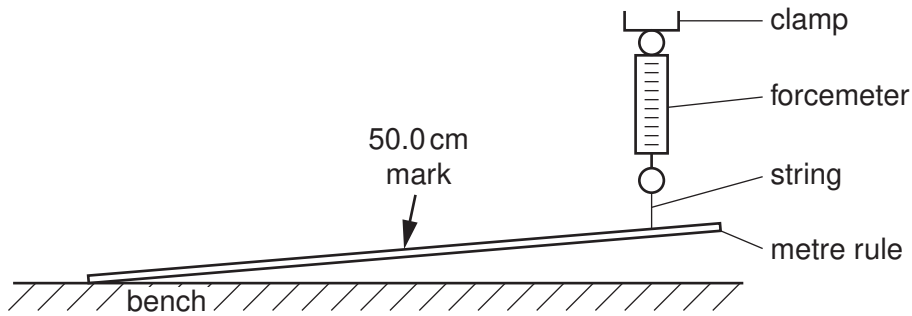
Fig. 1.1

You are provided with a metre rule that is attached at one end to the bench. The other end is supported by a forcemeter. Do not change the position of the forcemeter or move the end of the rule that is attached to the bench. You are also provided with a range of masses.

(a) Without placing a mass on the rule, record in Table 1.1 the reading F on the forcemeter.

(b) Place a 100 g mass on the rule at the 50.0 cm mark shown in Fig. 1.1. Record in the table the value of the mass m and the reading F on the forcemeter.

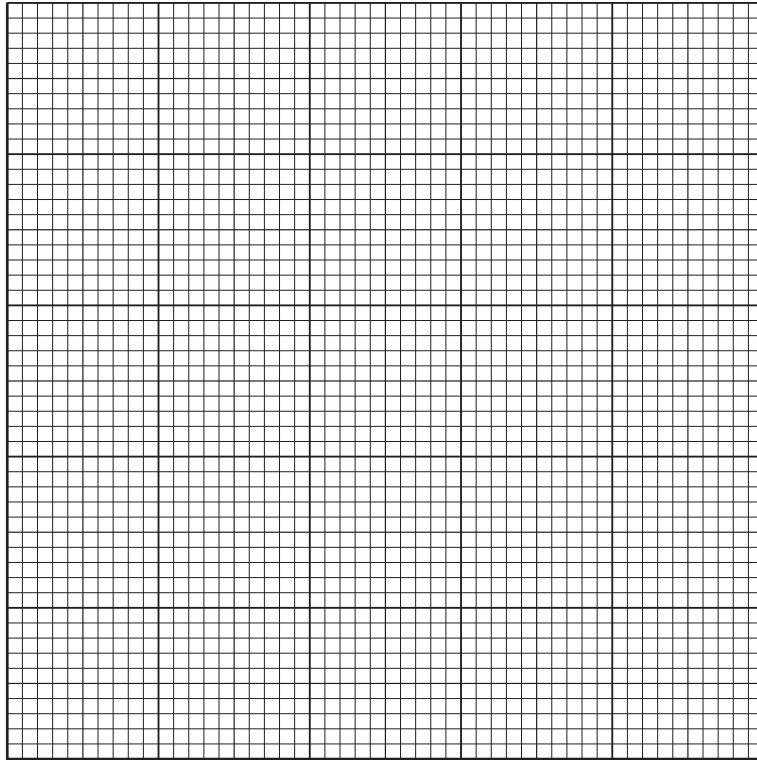**(c)** Repeat step **(b)** using masses of 200 g, 300 g, 400 g and 500 g.

Table 1.1

m / g	F / N
0	

[3]

(d) Plot a graph of F/N (y-axis) against m/g (x-axis).

[4]

(e) Use the graph to find the value of F when $m = 375$ g. Show clearly on the graph how you obtained the result.

F = ... [2]

(f) The forcemeter shows a reading when no mass has been added to the metre rule. Assuming that the forcemeter has no zero error, suggest a reason for the reading.

suggested reason ....

.... [1]

[Total: 10]

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

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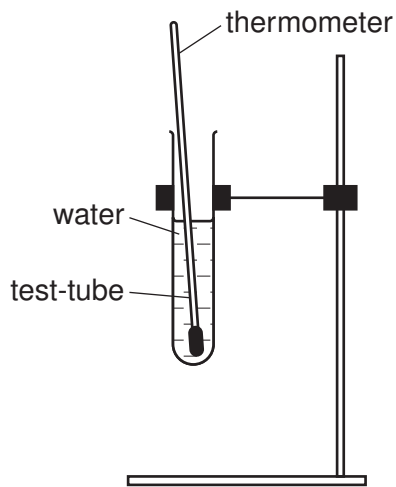

Fig. 2.1

(a) Measure and record room temperature θ_R.

θ_R = ... [1]

(b) Pour hot water into the test-tube until it is about two thirds full of water. Place the thermometer in the water.

(c) **(i)** When the thermometer reading stops rising, measure the temperature θ of the water in the test-tube and immediately start the stopclock. Record θ in Table 2.1 at time $t = 0\,$s.

  (ii) Record in the table the time t and the temperature θ of the water every 30 s until you have a total of seven readings.

(d) Remove the thermometer and pour away the water from the test-tube. Wrap the cotton wool round the test-tube and secure it with the elastic bands. Repeat the steps in **(b)** and **(c)**.

(e) Complete the time and temperature column headings in the table.

Table 2.1

t /	tube without cotton wool θ /	tube with cotton wool θ /
0		

[5]

(f) State in which experiment the cooling was more rapid. Justify your answer by reference to your readings.

experiment ....

justification ....

....

....[2]

(g) If these experiments were to be repeated in order to check the results, it would be important to control the conditions. Suggest two conditions that should be controlled.

1. ....

2. .... [2]

[Total: 10]

3 In this experiment you will investigate the resistance of a wire in different circuit arrangements.

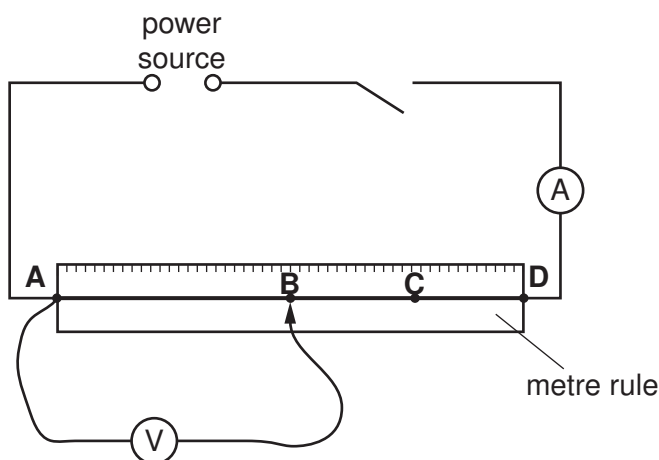The circuit shown in Fig. 3.1 has been set up for you.

Fig. 3.1

(a) (i) Switch on. Measure and record in Table 3.1 the current *I* in the circuit and the p.d. *V* across the section of wire **AB**. Switch off.

(ii) Record in the table the length *l* of the wire **AB**.

(iii) Calculate the resistance *R* of the section of wire **AB** using the equation

$$R = \frac{V}{I}.$$

Record this value of *R* in the table.

(iv) Complete the column headings in the table.

(v) Repeat steps **(i)** – **(iii)** with the voltmeter connected across section **AC** of the wire.

(vi) Repeat steps **(i)** – **(iii)** with the voltmeter connected across section **AD** of the wire.

Table 3.1

voltmeter connected across	*l* /	*I* /	*V* /	*R* /
AB				
AC				
AD				

[7]

(b) It is suggested that the resistance of the wire **AB** should be half the resistance of the wire **AD**. State whether your results support this suggestion and justify your answer with reference to your results.

statement ....

justification ....

.... [2]

(c) It is known that changes in temperature affect the resistance of the wire. Suggest how you can limit the temperature changes when carrying out this experiment.

....

.... [1]

[Total: 10]

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

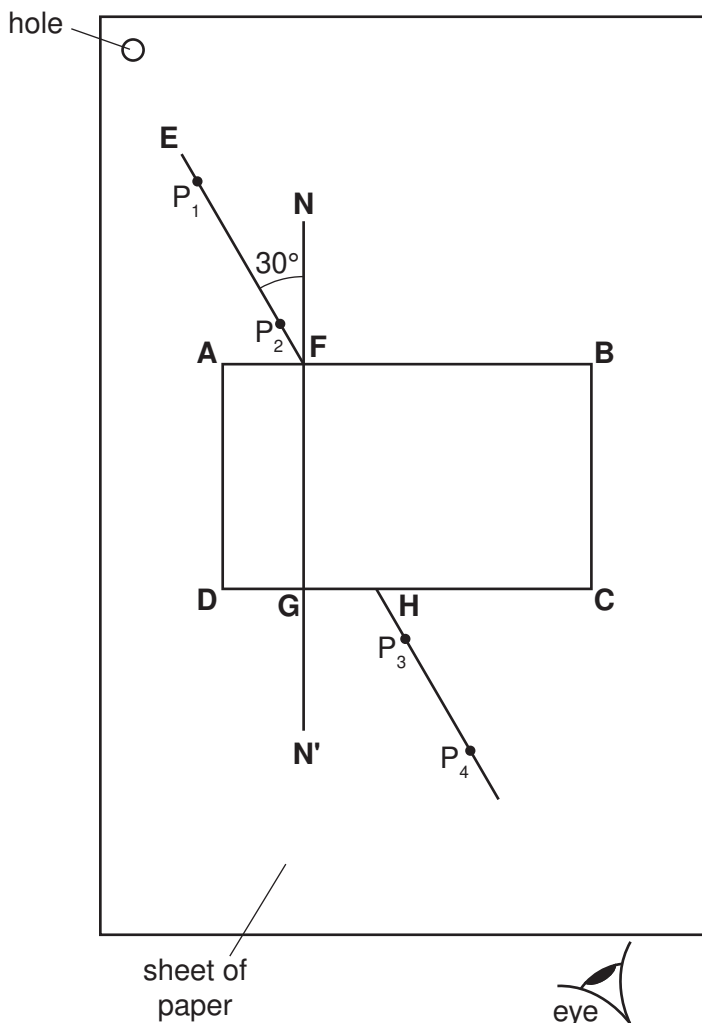Carry out the following instructions referring to Fig. 4.1.

Fig. 4.1

(a) Place the transparent block, largest face down, on the sheet of plain paper supplied. The block should be approximately in the middle of the paper. Draw and label the outline **ABCD** of the block.

(b) Remove the block and draw the normal **NN'** to side **AB** so that the normal is 2.0 cm from **A**. Label the point **F** where **NN'** crosses **AB** and **G** where it crosses **DC**.

(c) Draw the line **EF** at an angle of 30° to the normal, as shown in Fig. 4.1.

. (d) Place the paper on the pin board.

(e) Place two pins P_1 and P_2 on line **EF** as shown in Fig. 4.1.

(f) 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, P_4 and the images of P_1 and P_2, seen through the block, appear one behind the other. Mark and label the positions of P_1, P_2, P_3 and P_4. Remove the block.

(g) Draw a line joining the positions of P_3 and P_4. Continue the line until it meets **CD**. Label this point **H**.

(h) Measure and record the length a of the line **GH**.

$a = $ .... [1]

(i) Draw the line **HF**.

(j) Measure and record the length b of the line **HF**.

$b = $ ....[1]

(k) Calculate the refractive index n of the material of the block using the equation $n = \dfrac{b}{2a}$.

$n = $ .... [2]

(l) This experiment can be carried out using a ray of light, produced by a ray box, instead of by using optical pins. A student suggests that the ray box method will be more accurate. Assuming that the experiment is carried out with care, suggest one possible cause of inaccuracy using the optical pin method and one using the ray box method.

optical pin method ....

....

ray box method ....

.... [2]

Tie your ray trace sheet into this Booklet between pages 8 and 9. [4]

[Total: 10]

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