UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

PHYSICS **0625/05**

Paper 5 Practical Test **May/June 2008**

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 this 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 **11** printed pages and **1** blank page.

UNIVERSITY of CAMBRIDGE
International Examinations

[Turn over

1 In this experiment, you are to determine the weight of a mass using a balancing method. Carry out the following instructions referring to Fig. 1.1.
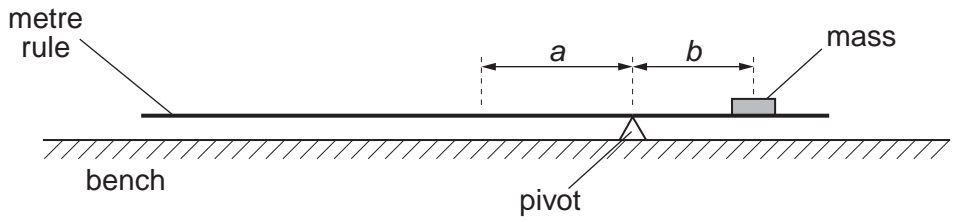

Fig. 1.1

(a) Place the mass on the metre rule so that its centre is directly above the 10.0 cm mark.

(b) Describe, with the aid of a diagram, how you judged that the centre of the mass was directly above the 10.0 cm mark.

[1]

(c) Place the rule on the pivot so that the rule is as near as possible to being balanced.

(d) Measure and record the distance *a* from the 50.0 cm mark (centre) of the rule to the pivot and the distance *b* from the centre of the mass to the pivot.

a = ...

b = ...[3]

(e) Calculate the weight W of the mass, using the equation

$$W = \frac{ka}{b}.$$

The value of k is given to you on a card close to the apparatus. Record the value of k.

$k = $ ....

$W = $ ....[1]

(f) Repeat the steps **(c)** to **(e)**, with the centre of the mass directly above the 20.0 cm mark on the metre rule.

$a = $ ....

$b = $ ....

$W = $ ....[3]

(g) Calculate and record the average of the two values for W. Show your working.

Average value for $W = $ ....[2]

[Total: 10]

2 In this experiment you are to compare the combined resistance of lamps in different arrangements.

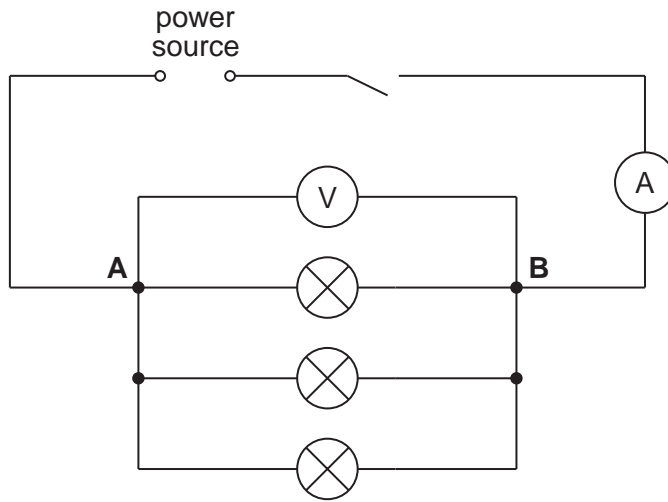**(a)** The circuit shown in Fig. 2.1 has been set up for you.

Fig. 2.1

(i) Switch on. Measure and record in row 1 of Table 2.1 (on page 5) the current I in the circuit and the p.d. V across points **A** and **B**. Switch off.

(ii) Calculate the combined resistance R of the three lamps using the equation

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

Record this value of R in the table.

(iii) Complete the column headings for each of the V, I and R columns of the table.

(iv) Disconnect the lamps and then reconnect them between points **A** and **B** as in Fig. 2.2.
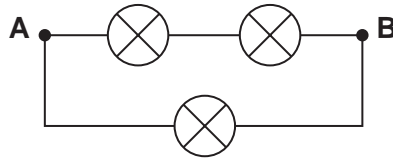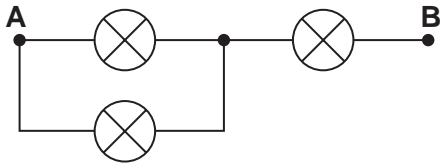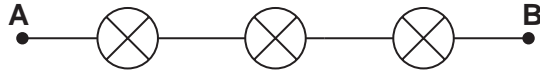

Fig. 2.2

Fig. 2.3

Fig. 2.4

(v) Switch on. Measure and record in row 2 of Table 2.1 the current I in the circuit and the p.d. V across points **A** and **B**. Switch off.

(vi) Calculate the combined resistance R of the three lamps using the equation

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

Record this value of R in Table 2.1.

Table 2.1

	$V/$	$I/$	$R/$
Fig. 2.1			
Fig. 2.2			
Fig. 2.3			
Fig. 2.4			

(vii) Repeat steps **(iv)** to **(vi)** using the arrangements of the lamps shown in Fig. 2.3 and Fig. 2.4. [7]

(b) Theory suggests that, if all three lamps have the same resistance under all con[ditions],
the combined resistance R recorded in row 1 will be one ninth of the comb[ined]
resistance R recorded in row 4.

(i) State whether, within the limits of experimental accuracy, your results support this
theory. Justify your answer by reference to the results.

statement ....

justification ....

....

(ii) Suggest a reason why the results may not support the theory.

....

....[3]

[Total: 10]

3 In this experiment you are to investigate the effect of surface area exposed to the air rate of cooling of hot water.

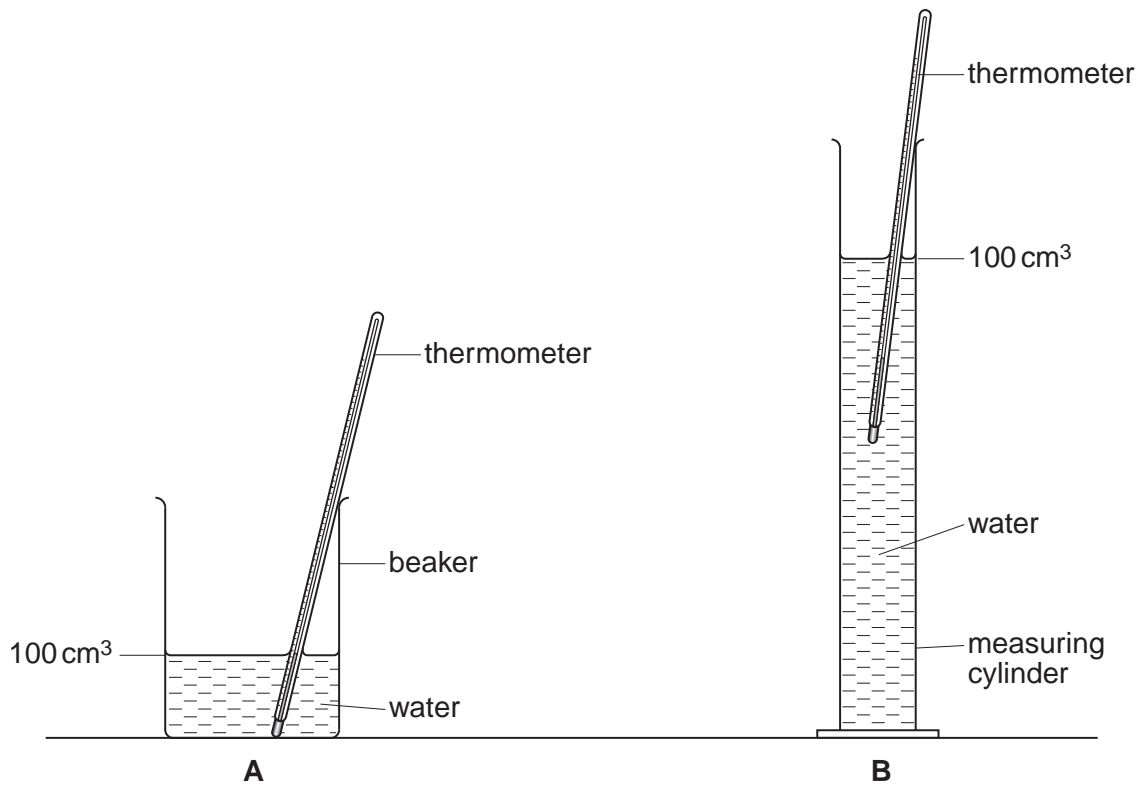Carry out the following instructions, referring to Fig. 3.1.

Fig. 3.1

You are provided with two containers labelled **A** (a beaker) and **B** (a measuring cylinder). You also have a supply of hot water.

(a) (i) Pour 100 cm³ of hot water into container **A**.

(ii) Measure the temperature θ of the hot water.
Record this temperature in Table 3.1 (on page 8) for time $t = 0\,\mathrm{s}$.

**(iii)** Start the stopwatch and then record the temperature of the water at 30 s in... for a total of four minutes.

Table 3.1

	container **A** (beaker)	container **B** (measuring cylinder)
t/s	θ/°C	θ/°C
0		
30		
60		
90		
120		
150		
180		
210		
240		

[3]

(iv) Pour 100 cm^3 of hot water into container **B**.

(v) Repeat steps **(ii)** and **(iii)**.

(b) (i) Use the data in Table 3.1 to plot a graph of the temperature of the water in the beaker (*y*-axis) against time (*x*-axis). Draw the best fit curve.

(ii) Using the same graph axes, plot another graph, of the temperature of the water in the measuring cylinder against time.

t/s
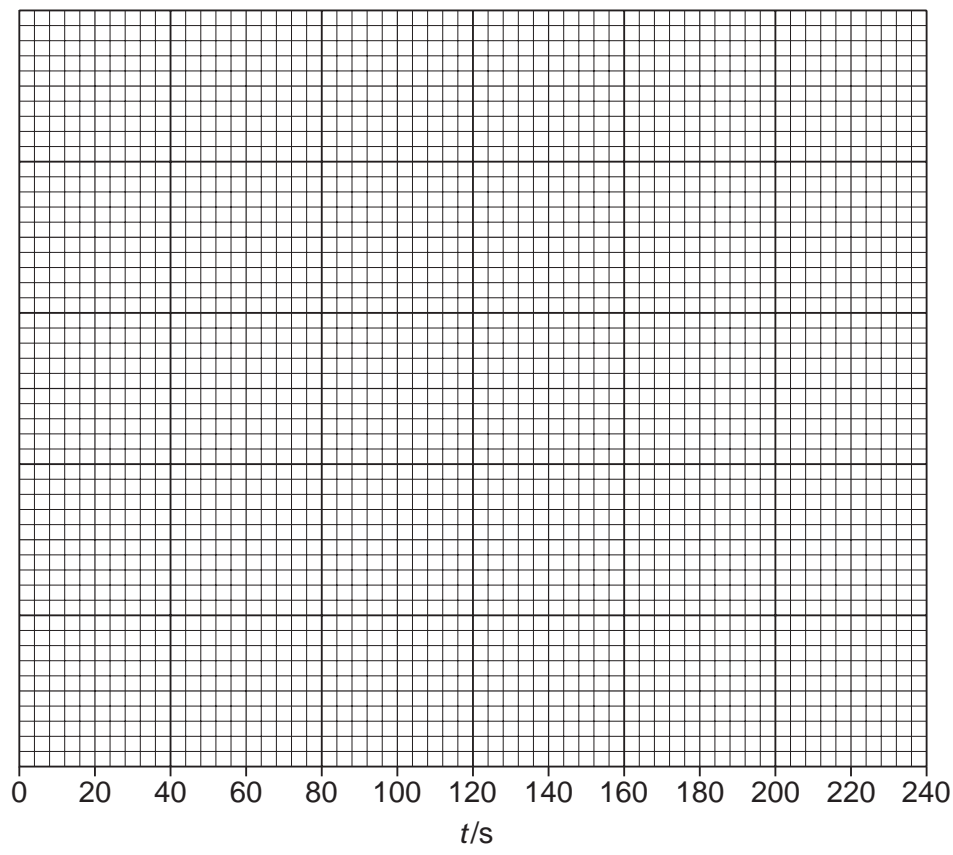
[5]

(c) The experiment you have just done was designed to investigate the effect of the surface area exposed to the air on the rate of cooling of hot water.
State the effect of a larger surface area on the rate of cooling. Justify your answer by reference to your graph.

statement ....

justification ....

....[2]

[Total: 10]

4 In this experiment you are to determine a quantity called the refractive index of the material of a transparent block.

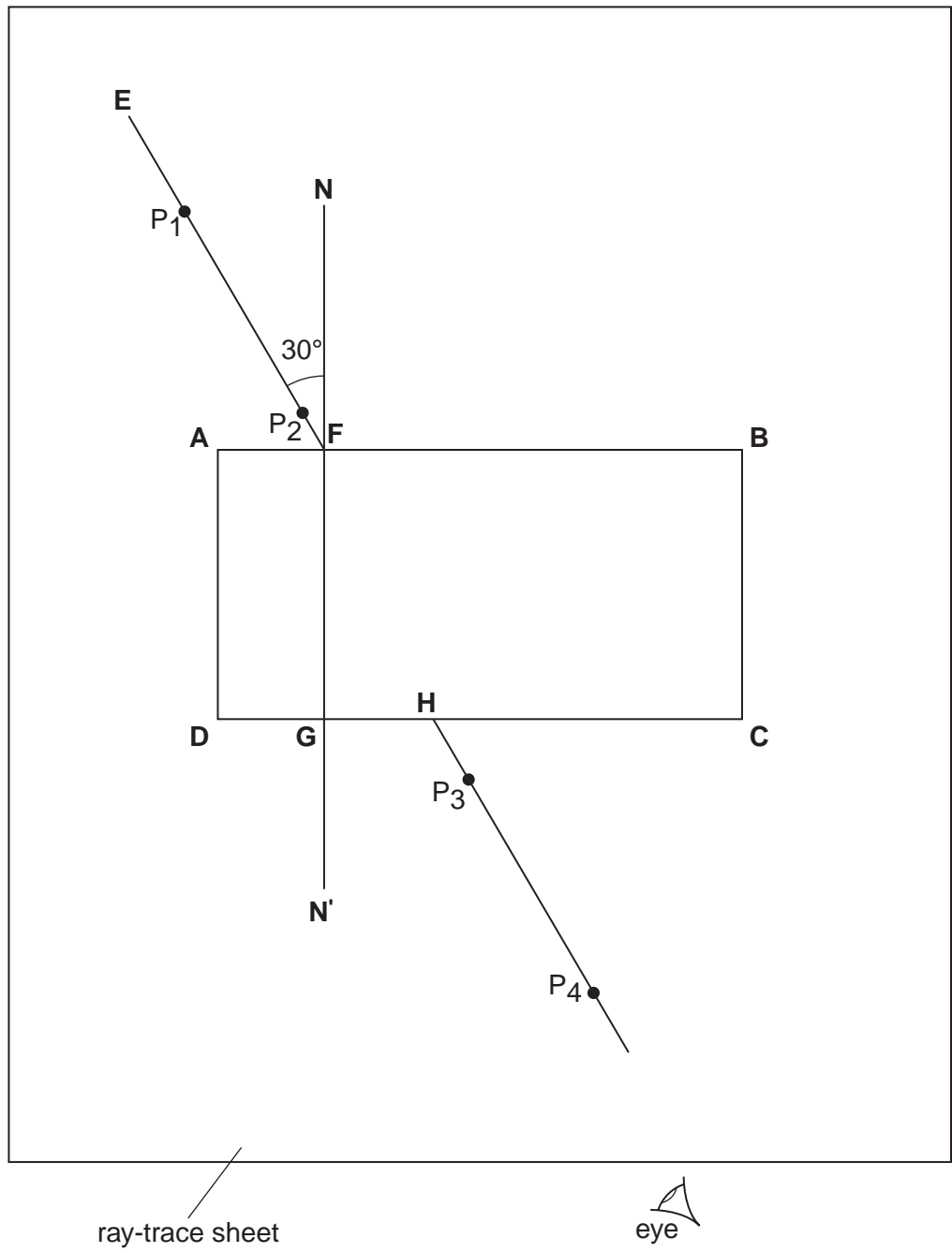Carry out the following instructions referring to Fig. 4.1.

Fig. 4.1

(a) Place the transparent block, largest face down, on the 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 the normal **NN'** to side **AB** so that the normal is 2.0 cm from **A**. Label the point **G** where **NN'** crosses **DC**. Label the point **F** where **NN'** crosses **AB**.

(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 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_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) Extend the straight line **EF** through the outline of the block to a point **J**. The point **J** must be at least 5 cm from the block. The line **EJ** crosses the line **CD**. Label this point **K**.

(l) **(i)** Measure and record the length *c* of the line **GK**.

c = ...

(ii) Measure and record the length *d* of the line **FK**.

d = ...[1]

(m) Calculate the refractive index *n* of the material of the block using the equation

$$n = \frac{cb}{ad}$$

n = ...[2]

Tie your ray-trace sheet opposite this page. [5]

[Total: 10]

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