Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICS **0625/06**

Paper 6 Alternative to Practical

May/June 2006

1 hour

Candidates answer on the Question Paper.
No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

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	
5	
Total	

This document consists of **12** printed pages.

1 The IGCSE class is determining the density of a sample of card.

Each student has a stack of ten pieces of card, as shown in Fig. 1.1.

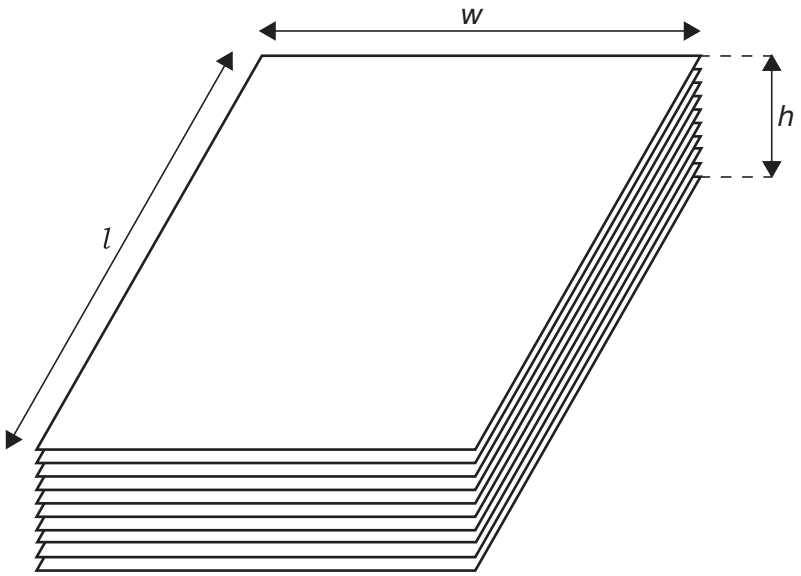

Fig. 1.1

(a) **(i)** On Fig. 1.1, measure the height *h* of the stack of card.

h = ... [1]

(ii) Calculate the average thickness *t* of one piece of card.

t = ... [2]

(b) **(i)** On Fig. 1.1, measure the length *l* and width *w* of the top piece of card.

l = ...

w = ... [1]

(ii) Calculate the volume *V* of one piece of card using the equation

$V = ltw$.

V = ... [2]

(c) Calculate the density d of the card using the equation

$$d = \frac{m}{V}$$

where the mass m of one piece of card is 1.3 g.

d = ... [2]

(d) A sample of corrugated card of the same length and width as the card in Fig. 1.1 consists of two thin sheets of card with an air gap in between. The sheets of card are separated by paper, as shown in the cross-section in Fig. 1.2. The thickness y of the air gap as shown in Fig. 1.2 is between 2 mm and 3 mm.

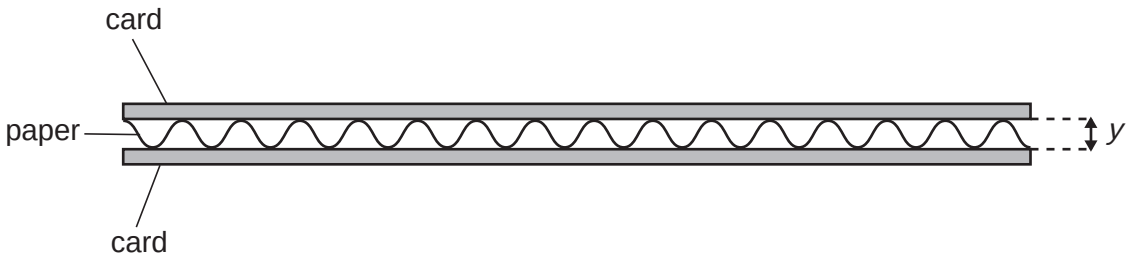

Fig. 1.2

Estimate the volume V_a of air trapped within the corrugated card shown in Fig. 1.2.

V_a = ... [1]

2 The IGCSE class is investigating the resistance of lamps in different circuit arrangements.

Fig. 2.1 shows a picture of the circuit.

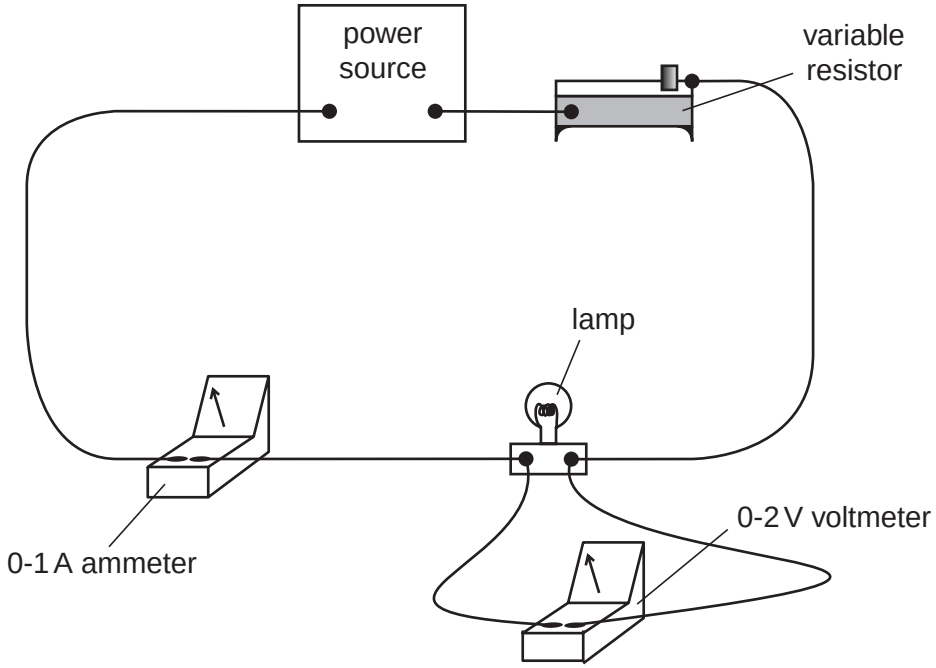

Fig. 2.1

(a) Draw a circuit diagram of the circuit shown in Fig. 2.1. Use standard circuit symbols.

[3]

(b) The current I through the lamp and the voltage V across the lamp are measured. Then a second lamp is connected in parallel with the first. The total current I in the circuit and the voltage V across the lamps are measured. The table below shows the readings.

I /	V /	R /
0.24	1.39	
0.45	1.30	

(i) Complete the column headings for each of the I, V and R columns of the table. [1]

(ii) Calculate the resistance R in each case using the equation

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

Enter the results in the table. [2]

[Turn over

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3 The IGCSE class is determining the refractive index of the material of a transparent block. Fig. 3.1. shows the drawing that a student makes.

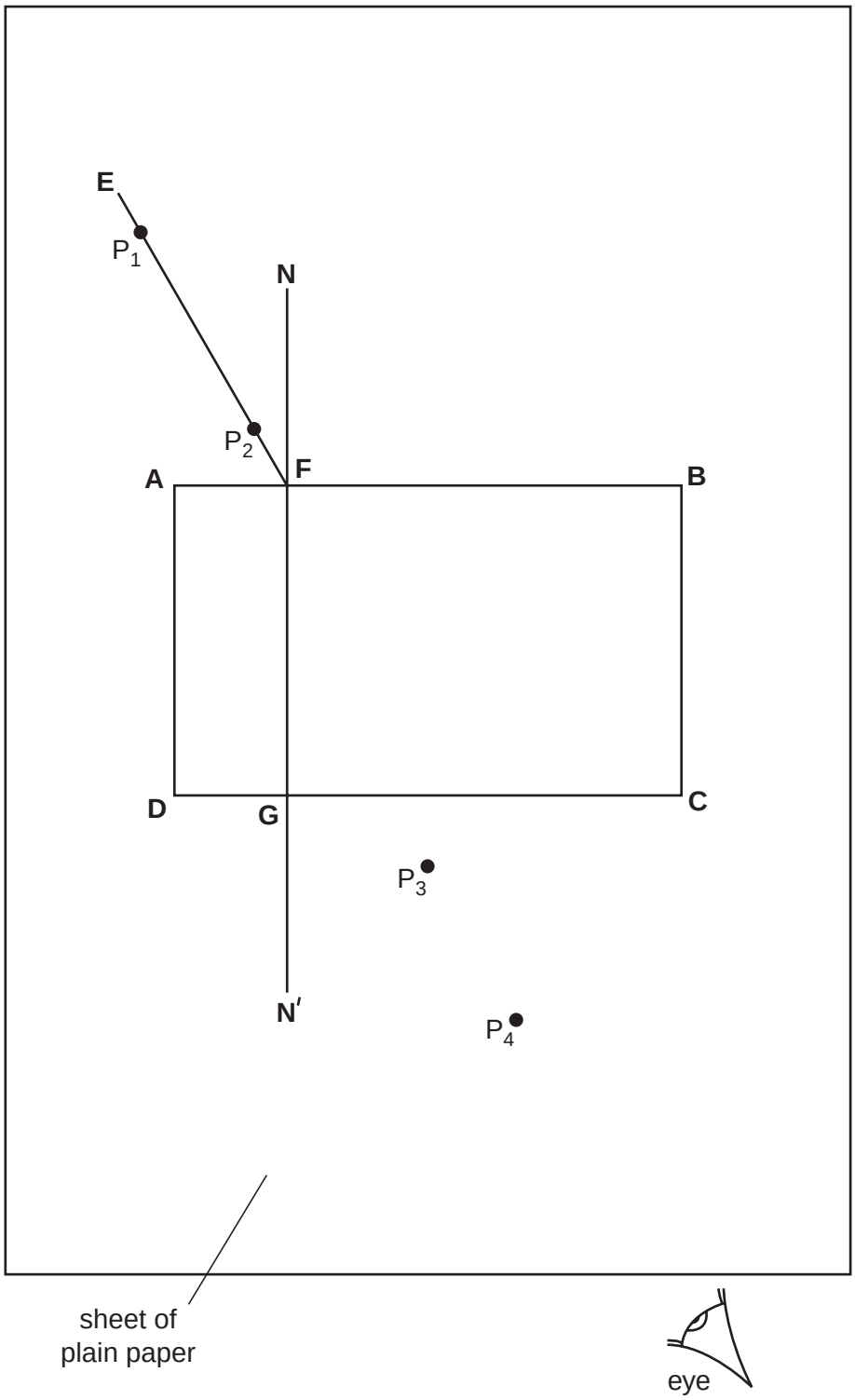


Fig. 3.1

The student places two pins P_1 and P_2 on line **EF** to mark an incident ray. Then she places the block on the paper and observes 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. She places two pins P_3 and P_4 between her 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.

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

(ii) Measure the distance *a* between **G** and **H**.

a = ... [1]

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

(iv) Measure the length *b* of the line **HF**.

b = ... [1]

(v) Extend the straight line **EF** within the outline of the block to a point **I**. The distance **FI** must be exactly equal to *b*.

(vi) From **I** draw a line that meets **NN′** at a right angle. Label this position **J**.

(vii) Measure the length *c* of the line **JI**.

c = ... [3]

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

$$n = \frac{c}{a} .$$

n = ... [2]

(b) Suggest two improvements you would make to this experiment to ensure an accurate result for the refractive index *n*.

1 .....

.....

2 .....

..... [2]

4 An IGCSE student is investigating the temperature rise of water in beakers heated by different methods. The apparatus is shown in Fig. 4.1. Beaker A is heated electrically and beaker B is heated with a Bunsen burner.

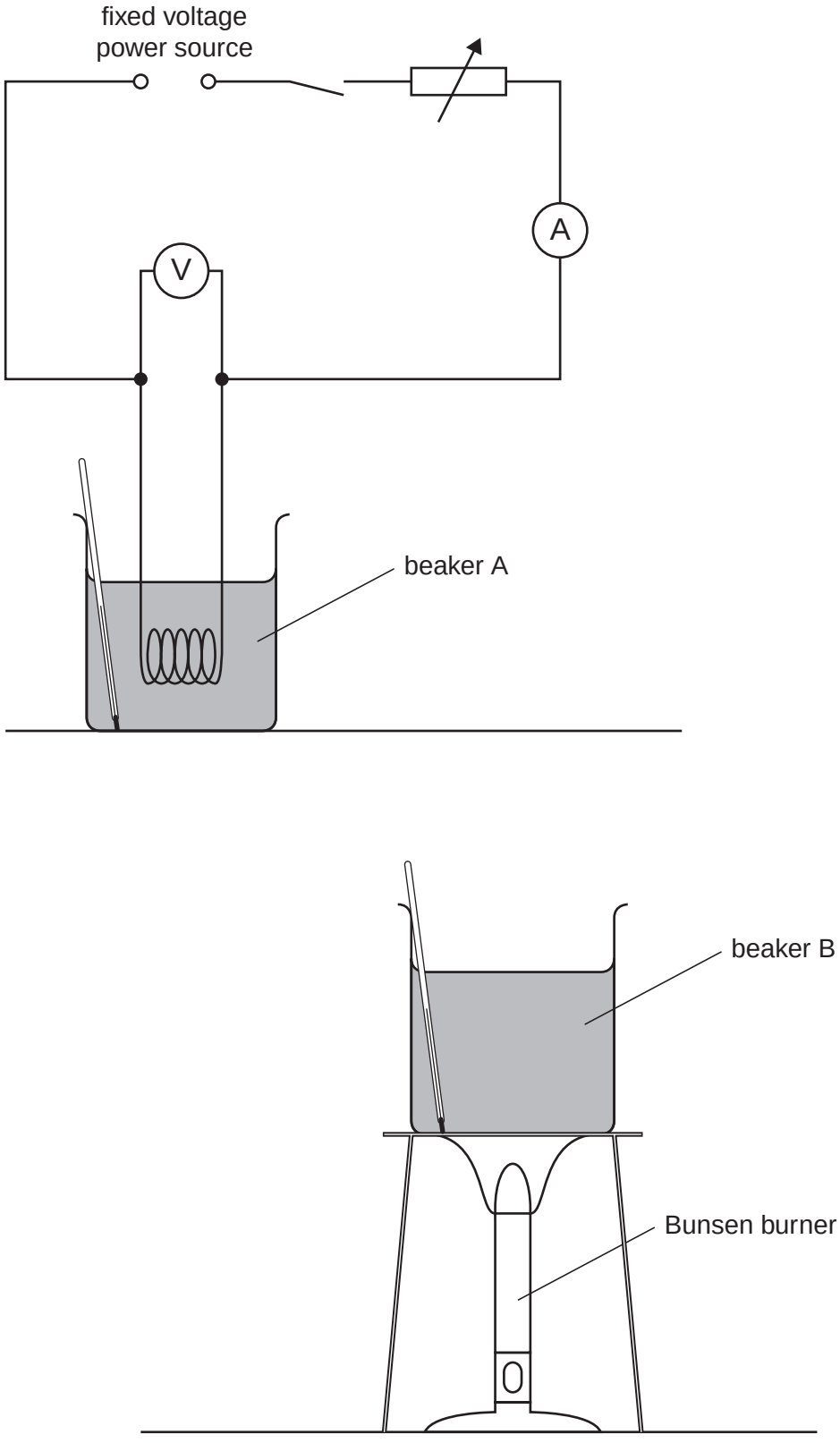


Fig. 4.1

The student first records room temperature.

(a) Fig. 4.2 shows the thermometer at room temperature.

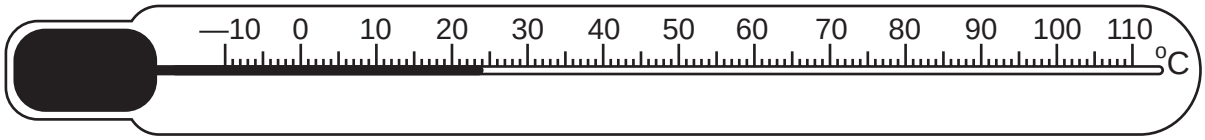


Fig. 4.2

(i) Write down the value of room temperature.

room temperature = ... [1]

(ii) The two beakers are heated from room temperature for the same length of time. The new water temperature for beaker A is 30 °C and for beaker B is 28 °C.

Calculate the temperature rise of the water in each beaker.

temperature rise in beaker A = ...

temperature rise in beaker B = ... [1]

(b) The electrical heater and the Bunsen burner both have the same power and both beakers were heated from room temperature for the same length of time. Suggest why there is a difference in temperature rise between beaker A and beaker B.

.....

.....

..... [2]

(c) In order to keep the heating effect of the electrical heater constant throughout the heating period, the student adjusts the current. Name the component in the circuit that the student uses for this purpose.

..... [1]

5 The IGCSE class is determining the weight of a metre rule.

The apparatus is shown in Fig. 5.1.

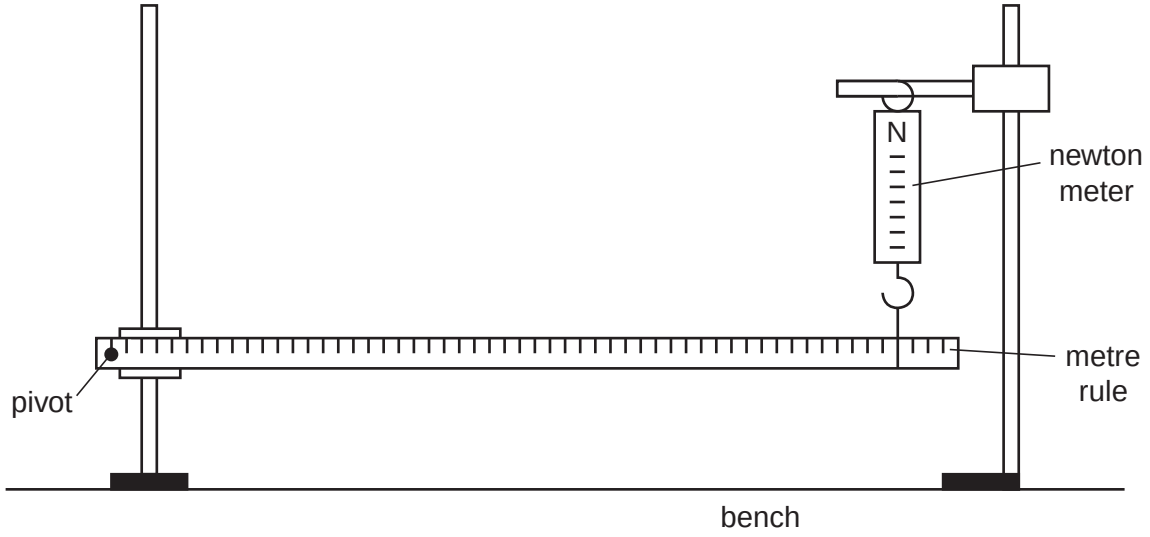


Fig. 5.1

A metre rule is supported at one end by a pivot through the 1.0 cm mark. The other end is supported at the 91.0 cm mark by a newton meter hanging from a clamp.

(a) Describe how you would check that the metre rule is horizontal. You may draw a diagram if you wish.

.....

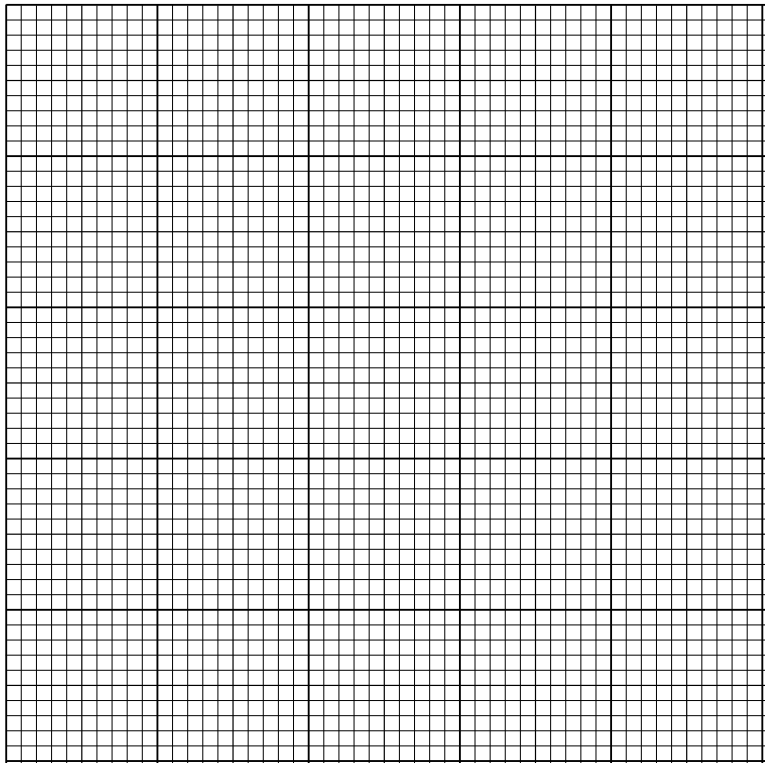
..... [1]

(b) The students record the force F shown on the newton meter and the distance d from the pivot to the 91 cm mark. They then repeat the experiment several times using a range of values of the distance d. The readings are shown in the table.

F / N	d / m	$\frac{1}{d} \,/\, \frac{1}{m}$
0.74	0.900	
0.78	0.850	
0.81	0.800	
0.86	0.750	
0.92	0.700	

Calculate and record in the table the values of $\frac{1}{d}$. [1]

(c) **(i)** On the graph grid below, plot a graph of F / N (y-axis) against $\frac{1}{d} \,/\, \frac{1}{\text{m}}$ (x-axis). Start the y-axis at 0.7 and the x-axis at 1.0. [2]



(ii) Draw the line of best fit on your graph. [2]

Question 5 continues on the next page.

(iii) Determine the gradient G of the line.

G = ... [3]

(d) Calculate the weight of the metre rule using the equation

$$W = \frac{G}{k}$$

where $k = 0.490$ m.

W = ... [2]