Centre Number		Candidate Number		Name	

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICS **0625/06**

Paper 6 Alternative to Practical

October/November 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 **11** printed pages and **1** blank page.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

1 The IGCSE class is determining the density of a type of wood.

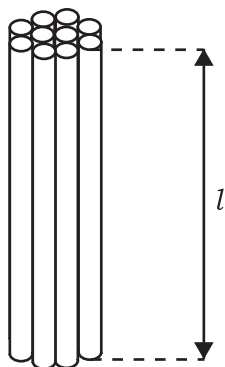The students are provided with a bundle of wooden rods, as shown in Fig. 1.1.

Fig. 1.1

(a) On Fig. 1.1, measure the length l of a rod.

l = ... cm [1]

(b) A student winds five turns of string round the bundle and marks the beginning and the end of the five turns. She then uses the metre rule to measure the distance x between the marks. She records that x = 24.5 cm.

(i) Determine the circumference c of the bundle of rods.

c = ...

(ii) Calculate the volume V of the bundle of rods using the equation

$$V = \frac{c^2 l}{4\pi}.$$

V = ... [4]

(c) The equation used in **(b)(ii)** assumes that the bundle is a solid cylinder. However, there are air gaps between the rods.

(i) Estimate the total volume V_r of the rods themselves.

V_r = ...

(ii) Calculate the density d of the wood using the equation

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

where the mass m of the bundle = 6.3 g.

d = ... [3]

4

2   The IGCSE class is investigating the swing of a loaded metre rule.

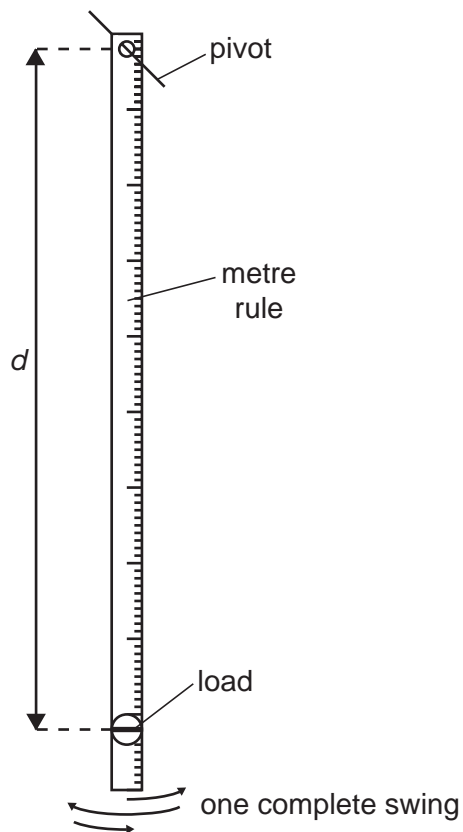The arrangement of the apparatus is shown in Fig. 2.1.

Fig. 2.1

The load is attached to the metre rule so that its centre is 90.0 cm from the pivot. The rule is displaced a small distance to one side and allowed to swing. The time t taken for 10 complete swings is recorded. This is repeated using different values of the distance d. The readings are shown in the table.

$d/$	$t/$	$T/$
90.0	18.35	
85.0	17.87	
80.0	17.53	
75.0	17.06	
70.0	16.72	

5

(a) Complete the column headings in the table. [1]

(b) Calculate the period *T* for each value of *d*. The period is the time taken for one complete swing. Enter the values in the table. [2]

(c) On the grid below, plot a graph of *T*/s (*y*-axis) against *d*/cm (*x*-axis). Start the *x*-axis at *d* = 70.0 cm and the *y*-axis at a suitable value of *T*/s to make best use of the graph grid. [5]
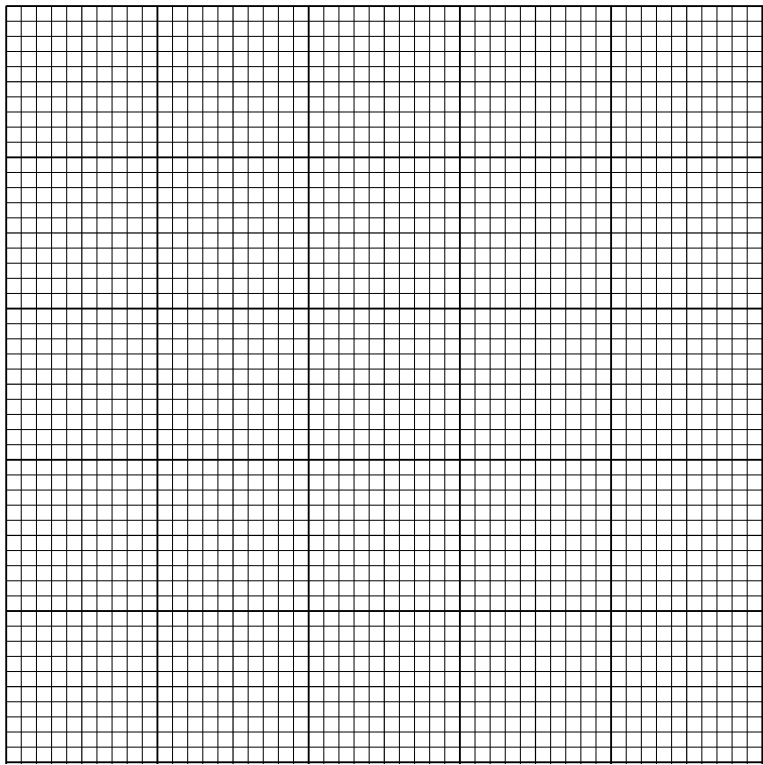
(d) A student suggests that *T* is proportional to *d*. State whether or not the results support this suggestion and give a reason for your answer.

statement ....

....

reason ....

.... [1]

(e) Explain why the student takes the time for ten swings and then calculates the time for one swing (the period), rather than just measuring the time for one swing.

....

.... [1]

3 The IGCSE class is investigating reflection in a plane mirror. Fig. 3.1 shows a ray diagram that a student is constructing.

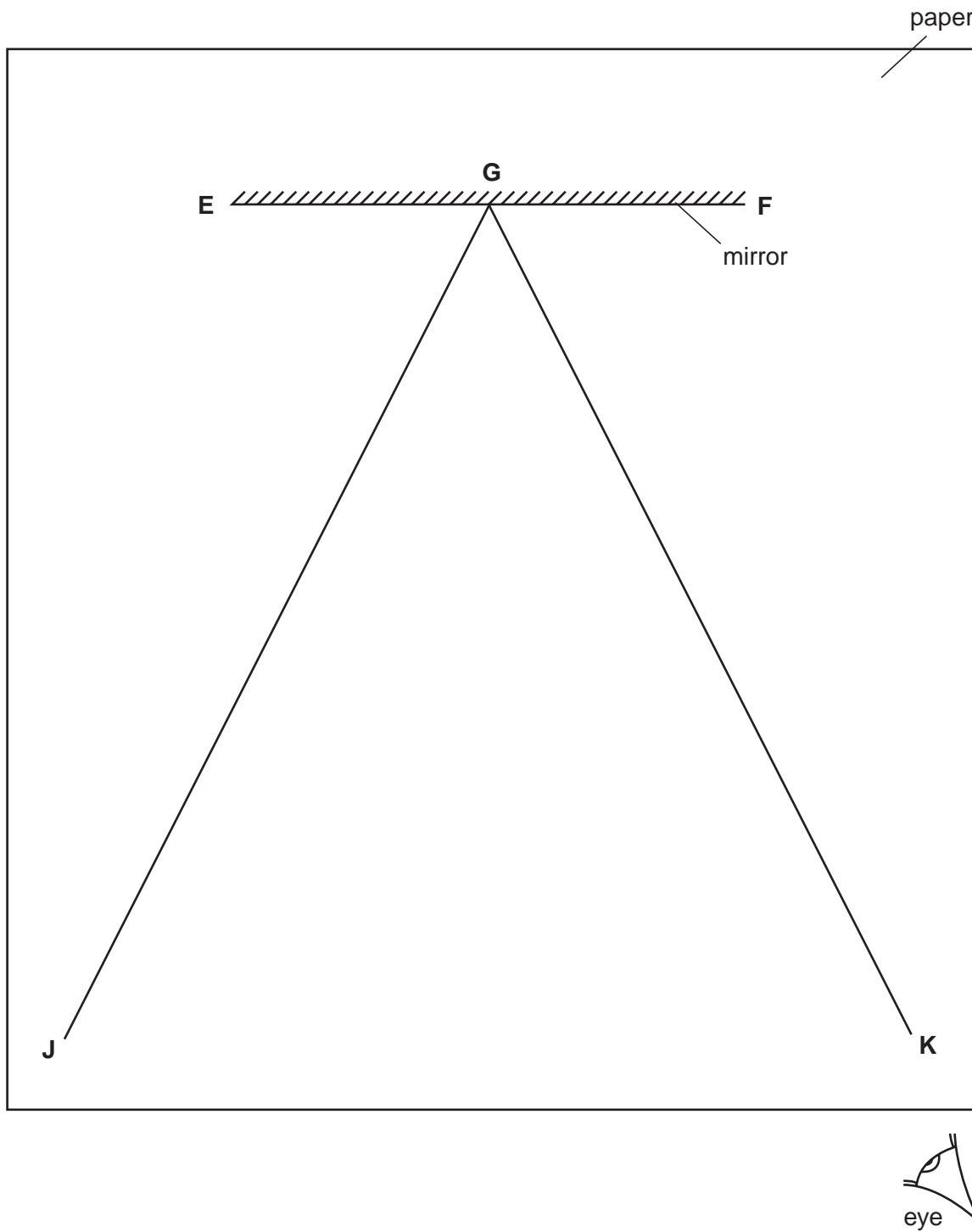**Fig. 3.1**

(a) **(i)** Draw a normal GH to line EF.

(ii) Mark a point A on line GJ so that the distance AG is 11.5 cm.

(iii) Measure the angle of incidence i between line GJ and the normal.

i = ... [3]

(b) The student pushes two pins into the paper on line GJ, one at point A, and the other at a point B nearer to the mirror. He views the images of the pins from the direction indicated in Fig. 3.1. He then pushes in two pins on line GK between his eye and the mirror so that these two pins and the images of the pins on line GJ appear exactly one behind the other.

(i) On Fig. 3.1, mark suitable positions for the pins on lines GJ and GK. Label the marks with letters B, C and D.

(ii) To obtain an accurate result for this experiment, would you view the tops, bases or central parts of the pins when lining them up? Give a reason for your answer.

I would view ....

reason ....

....

.... [3]

4 The IGCSE class is investigating conditions affecting the rate of cooling of a beaker of hot water.

(a) The students start by measuring room temperature. Record the value of room temperature as shown on the thermometer in Fig. 4.1.
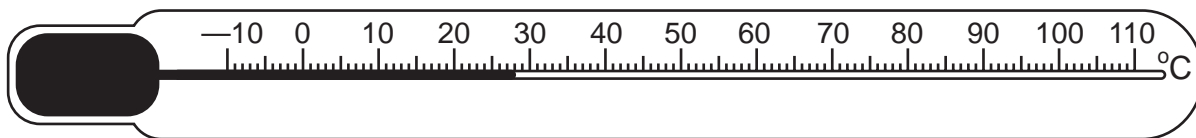

Fig. 4.1

temperature = ... [2]

(b) The students are provided with hot water in beakers as shown in Fig. 4.2. Beaker **A** is insulated and beaker **B** has a lid.

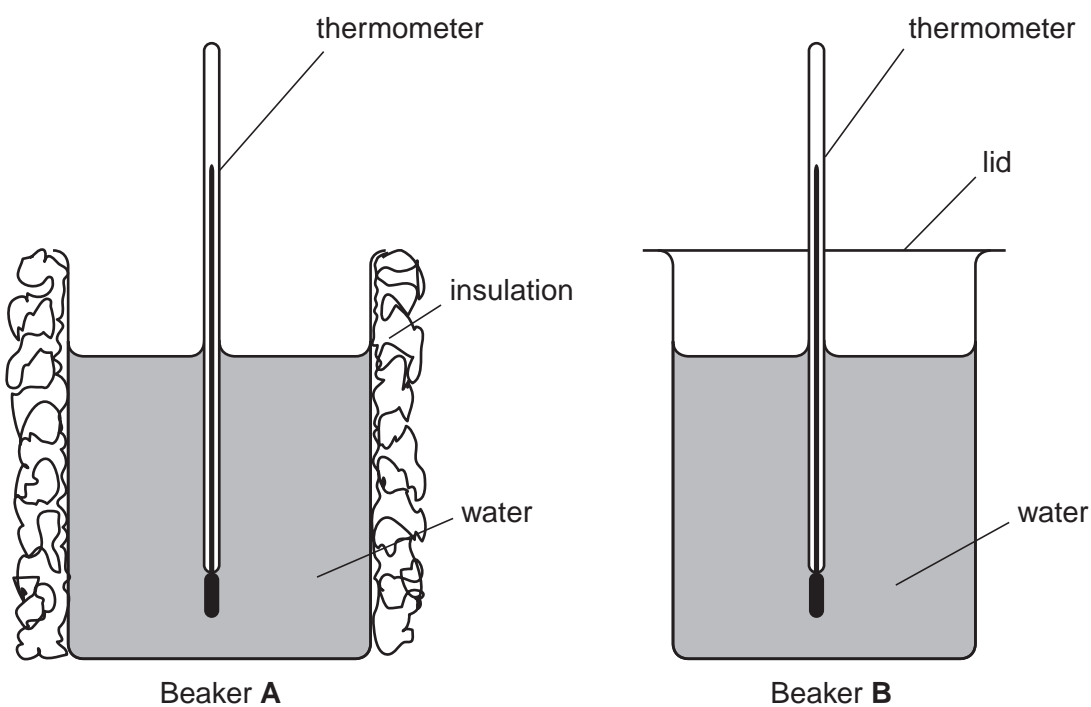Beaker **A**   Beaker **B**

Fig. 4.2

The students measure and record the temperature θ of the water in each beaker every 30 s for a total of five minutes. One student's readings are shown in the tables.

9

beaker **A**

time / s	θ / °C
0	83.0
30	82.0
60	81.0
90	79.5
120	79.0
150	77.0
180	75.0
210	74.0
240	72.0
270	71.0
300	70.0

beaker **B**

time / s	θ / °C
0	82.0
30	82.0
60	81.0
90	80.0
120	79.0
150	78.0
180	76.0
210	75.0
240	74.0
270	73.0
300	72.0

(i) Look at the temperature readings in the tables. State whether the insulation round beaker A or the lid on beaker B or neither is most effective in keeping the water hot. By reference to readings in the tables, justify your answer.

statement ....

justification ....

.... [2]

(ii) Suggest a suitable material for the insulation around beaker A.

.... [1]

(iii) To obtain reliable results in this experiment, it is important that variables are controlled. State three variables that should be controlled in this experiment.

variable 1 ....

variable 2 ....

variable 3 .... [3]

5 A student is investigating the relationship between potential difference *V* across a resistor and the current *I* in it. Fig. 5.1 shows the apparatus that the student is using.
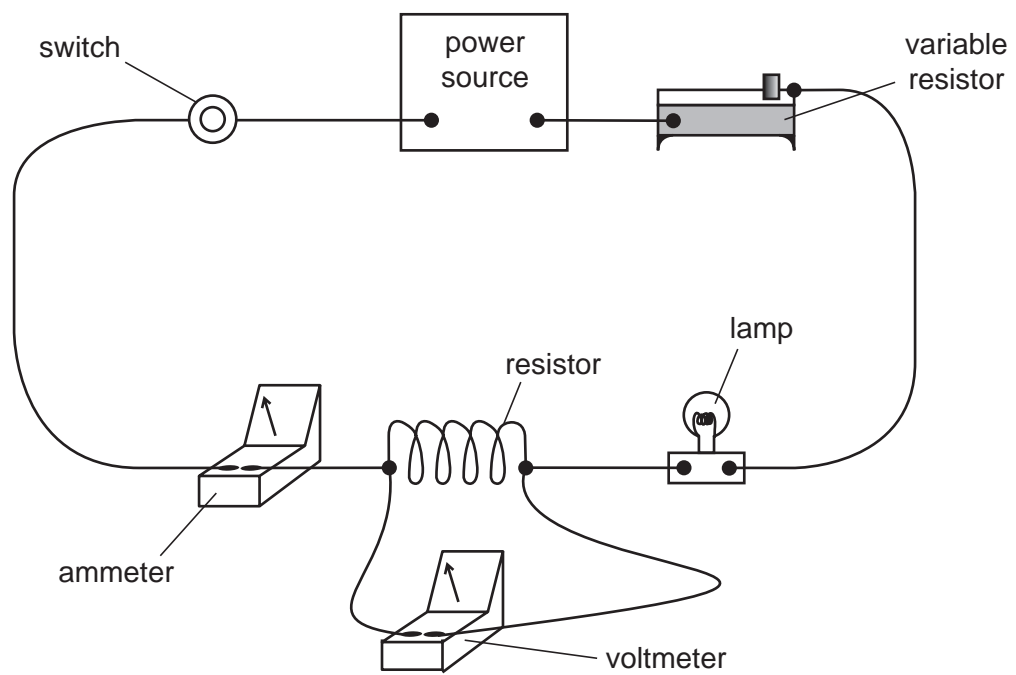

Fig. 5.1

(a) Draw the circuit diagram of the circuit shown in Fig. 5.1. Use standard circuit symbols.

[3]

(b) The student is using a lamp to show when the current is switched on.

Why is it unnecessary to use the lamp?

....

.... [1]

11

(c) State which piece of apparatus in the circuit is used to control the size of the current.

.... [1]

(d) The student removes the lamp from the circuit. He is told that the resistance of a conductor is constant if the temperature of the conductor is constant. He knows that the current in the resistor has a heating effect. Suggest two ways in which the student could minimise the heating effect of the current in the resistor.

1. ....

2. .... [2]

(e) Fig. 5.2 shows a variable resistor with the sliding contact in two different positions.

metal bar   sliding contact in position **A**

coil of resistance wire

sliding contact in position **B**   metal bar

coil of resistance wire
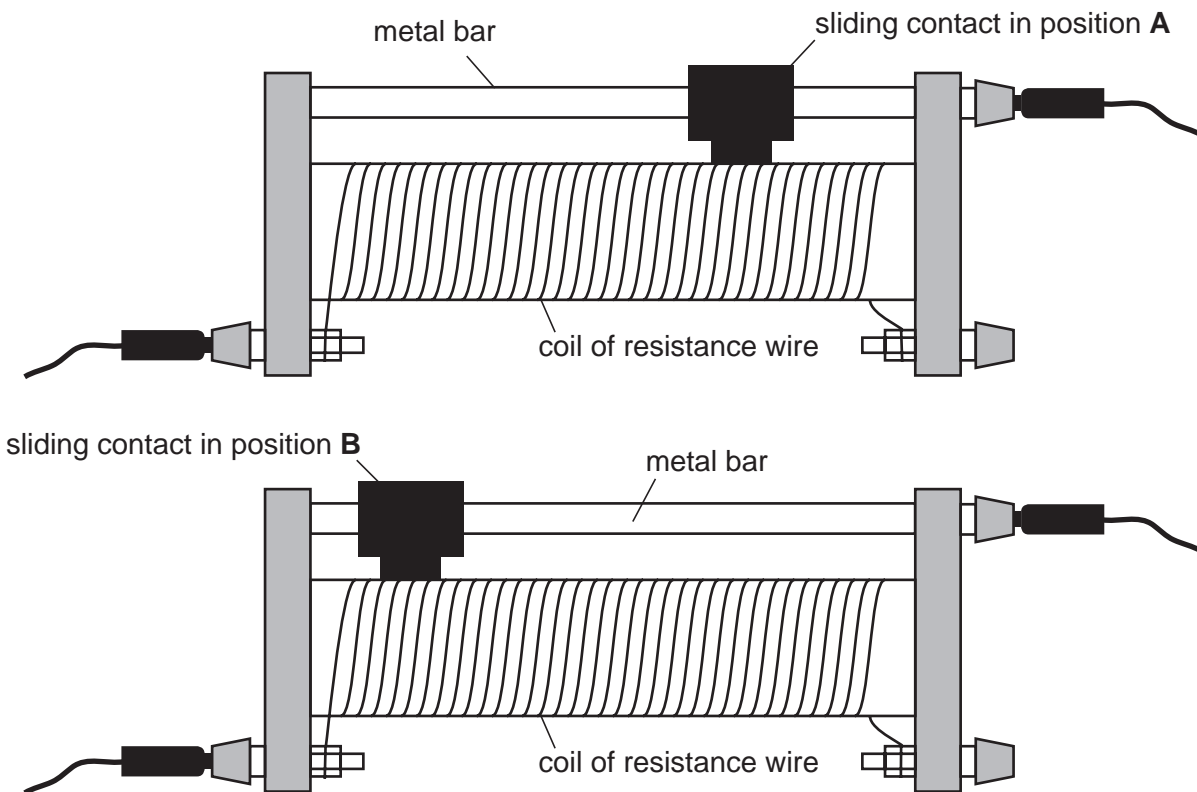
Fig. 5.2

State which position, A or B, shows the higher resistance setting. Explain your answer.

statement ....

explanation ....

.... [1]

12

BLANK PAGE