

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

**PHYSICS**

**0625/05**

Paper 5 Practical Test

October/November 2004

**1 hour 15 minutes**

Additional Materials: As specified in the Confidential Instructions

**READ THESE INSTRUCTIONS FIRST**

Follow the instructions on the front cover of the Answer Booklet.  
Write your answers in the spaces provided in the Answer Booklet.

Answer **all** questions.

You are expected to record all your observations as soon as they are made.

An account of the method of carrying out the experiments is **not** required.

At the end of the examination, hand in only the Answer Booklet.

This document consists of **6** printed pages, **2** blank pages and an inserted Answer Booklet.



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- 1 In this experiment, you are to investigate the air temperature above a beaker of hot water.

Record all of your observations on page 2 of your Answer Booklet.

Carry out the following instructions referring to Fig. 1.1.

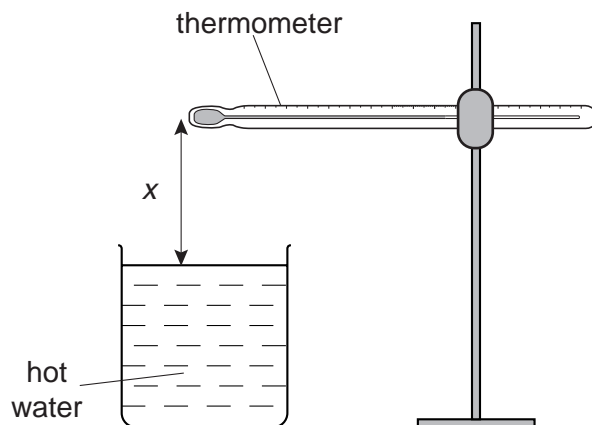


Fig. 1.1

- (a) Place the thermometer so that its bulb is directly above the centre of the beaker and a distance  $x = 100$  mm from the water surface. Wait for about 30 s. In the table, record the distance  $x$  between the thermometer bulb and the water surface, and the temperature  $\theta$  shown on the thermometer.
- (b) Move the thermometer so that its bulb is a distance  $x = 80$  mm from the surface of the water. The thermometer bulb should remain directly above the centre of the beaker. Wait for about 30 s. In the table, record the distance  $x$  and the temperature  $\theta$  shown on the thermometer.
- (c) Repeat the steps described in (b) using values of  $x$  of 60 mm, 50 mm, 40 mm, 30 mm and 20 mm.
- (d) Complete the column headings in the table.
- (e) Plot a graph of temperature ( $y$ -axis) against distance ( $x$ -axis).
- (f) Use your graph to estimate room temperature. Explain briefly how you obtained your estimate.

2 In this experiment, you are to investigate the period of oscillation of a simple pendulum.

Record all of your observations on page 4 of your Answer Booklet.

Carry out the following instructions referring to Fig. 2.1. and Fig. 2.2.

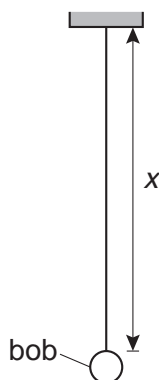


Fig. 2.1

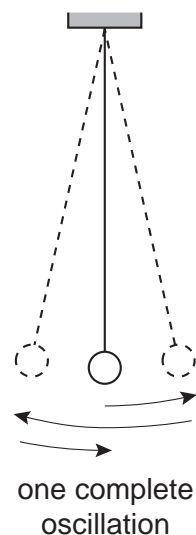


Fig. 2.2

- (a) Using the two pieces of wood provided and a rule, measure as accurately as you can the diameter  $d$  of the pendulum bob.
- (b) Draw a labelled diagram to show how you used the two pieces of wood and the rule to obtain an accurate measurement of the diameter  $d$ .
- (c) Adjust the clamp so that the pendulum string has a length  $x = 60.0$  cm (from the support to the bob, as shown in Fig. 2.1).
- (d) Calculate the length  $l$  of the pendulum, using the equation  $l = (x + d/2)$ .
- (e) Displace the pendulum bob by a small amount and release it so that it swings. Measure the time  $t$  for 20 complete oscillations of the pendulum (see Fig. 2.2).
- (f) Calculate the period  $T$  of the pendulum. The period is the time for one complete oscillation.
- (g) Calculate the value of  $T^2/l$ .
- (h) Repeat steps (c) to (g) using values of  $x = 40.0$  cm and  $x = 20.0$  cm.
- (i) A student suggests that  $T^2/l$  should be a constant. State with a reason whether your results support this suggestion.

3 In this experiment, you will investigate the resistance of a wire.

Record all of your observations and answers on page 5 of your Answer Booklet.

Carry out the following instructions referring to Fig. 3.1, which shows the circuit that has been set up for you.

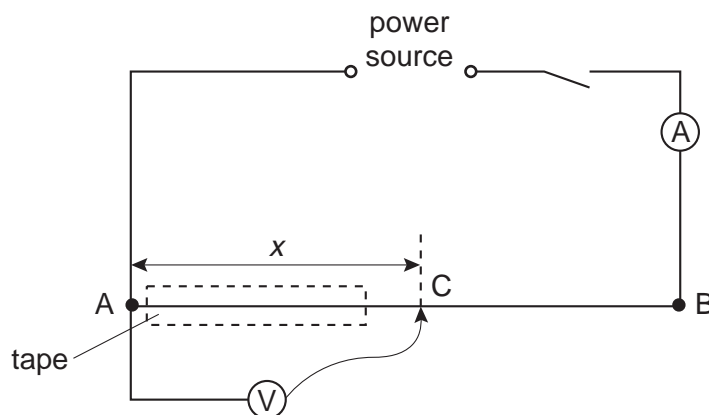


Fig. 3.1

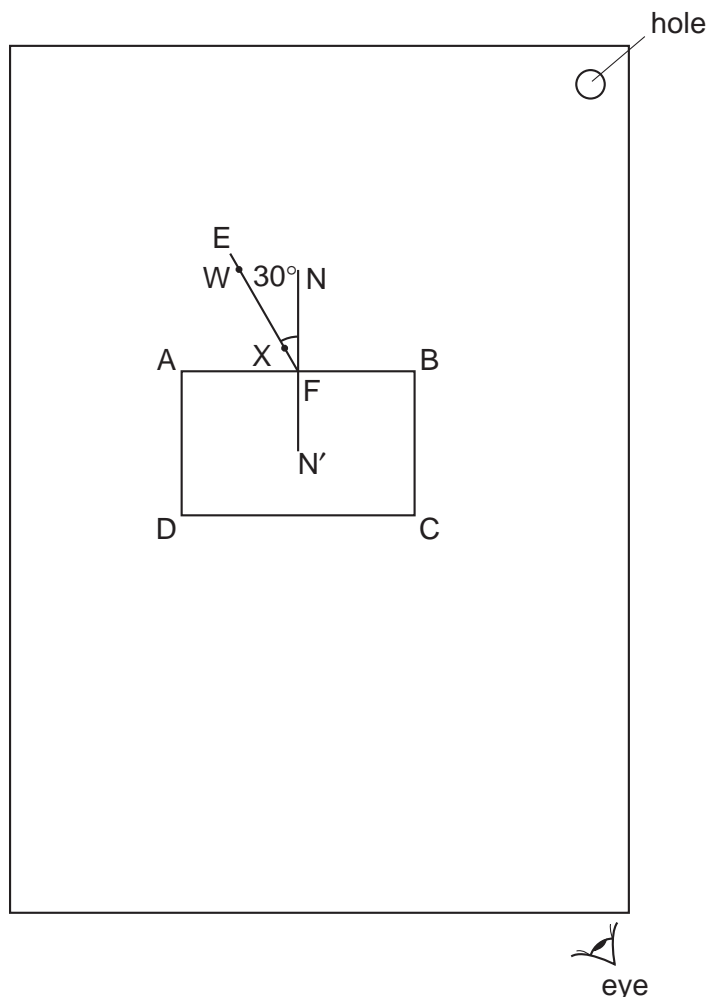
You are provided with a resistance wire AB. Part of the wire has been covered with insulating tape. Do **not** remove this insulating tape.

- (a) Place the sliding contact C on the resistance wire AB at a distance  $x$  from A, where  $x = 0.500$  m.
- (b) Record the value of  $x$ .
- (c) Switch on and, using the voltmeter, measure the p.d.  $V$  across the wire between A and C. Record the value of  $V$ .
- (d) Using the ammeter, measure the current  $I$  in the wire. Record the value of  $I$ .
- (e) Take the sliding contact away from the wire AB and switch off.
- (f) Calculate the resistance  $R$  of the section AC of the wire using the equation  $R = \frac{V}{I}$ .
- (g) Repeat steps (a) to (f) with the sliding contact at distances of  $x = 0.750$  m and  $x = 0.900$  m from A.
- (h) Complete the column headings in the table.
- (i) Within the limits of experimental error, what do you conclude about the variation of resistance with distance along the wire? Justify your conclusion by reference to your table of results.
- (j) Suggest with a reason a value for  $R$  when  $x = 0.200$  m.

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

Record all of your observations and answers on page 7 of your Answer Booklet.

Carry out the following instructions referring to Fig. 4.1.



**Fig. 4.1**

- (a) Position the sheet of paper so that the hole is at the top right-hand corner. Place the transparent block on the paper with its largest face down and approximately in the centre of the paper. Draw round the block and label the corners A, B, C and D (see Fig. 4.1). Remove the block.
- (b) Draw a normal to line AB, approximately at the centre, and label the normal NN'.
- (c) Draw a line EF above the line AB and at  $30^\circ$  from the normal.
- (d) Place the paper on the cork mat and push a pin X into the paper on line EF close to line AB. Push another pin W into line EF some distance away from line AB.
- (e) Replace the block on the paper.

- (f) View the images of pins W and X through the block. Place two pins Y and Z between your eye and the block so that Y, Z and the images of W and X appear exactly one behind the other.
- (g) Mark the positions of pins W, X, Y and Z on the paper. Remove the pins and the block. Using a rule, draw a line joining Y and Z and continue the line to meet the line CD at a point, which you should label G.
- (h) Draw a line to join the points F and G.
- (i) Measure the angle  $r$  between line FG and the normal.
- (j) Extend the line EF through line CD and to almost the edge of the paper. Label the point at which the line cuts CD with the letter H.
- (k) Measure the distance  $x$  between points G and H.
- (l) Draw a line parallel to and 5.0 cm below line CD. This line cuts lines YZ and FH. Label the points at which it cuts these lines with the letters J and K. Measure the distance  $y$  between J and K.

**Tie your sheet of paper into the Answer Booklet.**

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