

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICS

0625/05

Paper 5 Practical Test

October/November 2003

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 these observations 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.

- 1 In this experiment, you are to investigate the rate of cooling of water in two different containers. Record all of your observations and readings on pages 2 and 3 of your Answer Booklet. Carry out the following instructions, referring to Fig. 1.1 and Fig. 1.2.

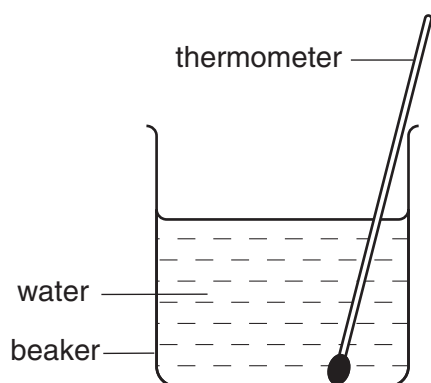


Fig. 1.1

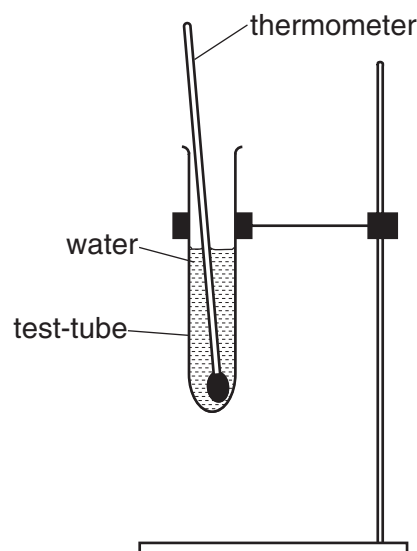


Fig 1.2

- (a) Place a thermometer in the test-tube of water. Place the second thermometer in the beaker of water.
- (b) (i) Measure the temperature θ of the water in the test-tube. Record θ in Table **A** at time $t = 0$ s. Start the stopclock.
- (ii) When the stopclock reads 30 s, record in Table **B** the temperature θ of the water in the beaker.
- (iii) When the stopclock reads 60 s, record in Table **A** the temperature of the water in the test-tube.
- (iv) When the stopclock reads 90 s, record in Table **B** the temperature of the water in the beaker.
- (v) When the stopclock reads 120 s, record in Table **A** the temperature of the water in the test-tube.
- (vi) Continue taking alternate readings from the two thermometers so that you have temperature readings in Table **A** at 180 s, 240 s and 300 s and temperature readings in Table **B** at 150 s, 210 s and 270 s.
- (c) Complete the temperature and time column headings in the tables.
- (d) (i) Using the readings in Table **A**, plot a graph of $\theta/^\circ\text{C}$ (y -axis) against t/s (x -axis). Draw the best-fit line for the plotted points. Label the line 'test-tube'.
- (ii) Using the same axes, plot the readings in Table **B**. Draw the best-fit line for the plotted points. Label the line 'beaker'.
- (e) State whether the water in the beaker or the water in the test-tube cooled more quickly. Justify your answer by reference to your graph.

2 In this experiment, you are to find the position of the centre of mass of an object.

Record all of your observations and answers on page 4 of the Answer Booklet.

Carry out the following instructions, referring to Fig. 2.1.

You are provided with a shaped sample of plasticine. **Do not change its shape.**

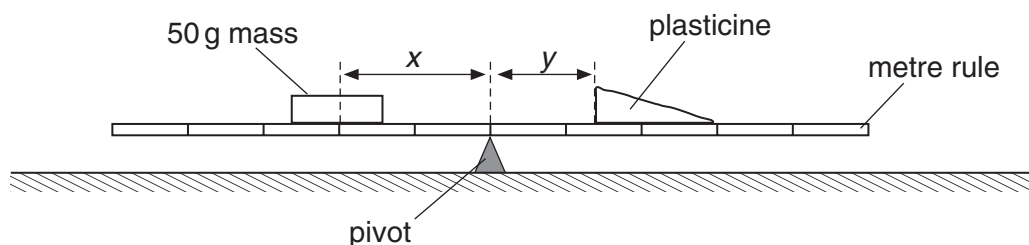


Fig. 2.1

- Place the metre rule on the pivot so that the 50.0 cm mark is directly over the pivot.
- Place the 50 g mass on the metre rule so that its centre is at the 30.0 cm mark. Record the distance x from the 30 cm mark to the pivot.
- Place the plasticine on the metre rule with the thickest end nearer the pivot (see Fig. 2.1). Move the plasticine until the rule balances (do not change the position of the 50 g mass or the pivot). Measure and record the distance y between the pivot and the end of the plasticine nearer the pivot (see Fig. 2.1).
- Calculate the distance d between the centre of mass of the plasticine and the pivot using the equation

$$d = kx,$$

where $k = 1.25$.

- Calculate the distance t between the thicker end of the plasticine and its centre of mass using the equation

$$t = (d - y).$$

- Move the 50 g mass so that $x = 30.0$ cm. The pivot must still be at the 50.0 cm mark. Repeat steps (c)–(e).
- Calculate the average value for t .

- 3 In this experiment, you are to investigate reflection in a plane mirror.

Record all of your observations and answers on page 7 of the Answer Booklet. The ray trace sheet must be tied into the Answer Booklet in front of page 6 after you have completed the experiment.

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

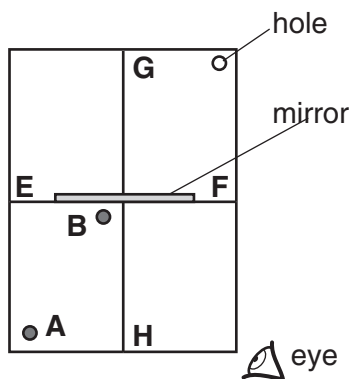


Fig. 3.1

- Draw a straight line **EF** across the middle of the ray trace sheet and another line **GH** down the middle of the sheet, as shown in Fig. 3.1. The hole must be at the top right-hand corner.
- Place the ray trace sheet on the pin board. Place the mirror so that its front surface stands along the line **EF**.
- Push a pin **A** into the surface at a point near the bottom left-hand corner of the sheet about 3 cm from each edge.
- Push another pin **B** into the surface at a point near the mirror and to the left of the line **GH**.
- View the images of the pins **A** and **B** from the direction indicated in Fig. 3.1. Push in two pins **C** and **D** between your eye and the mirror so that **C**, **D** and the images of **A** and **B** appear exactly one behind the other.
- Mark the positions of pins **A**, **B**, **C** and **D** on the ray trace sheet. Remove the pins and the mirror. Using a rule, draw a line joining **A** and **B** and continue the line to meet the line **EF**.
- Repeat the steps (b) to (f) using the same position of pin **A** but a position of pin **B** that is about 1 cm to the left of the original position.
- Extend both **CD** lines to the point behind the mirror where they meet. Mark this position **X**.
- Draw the line **XA**. Mark the position where the line **XA** cuts **EF**. Label this point **Y**.
- Measure and record the distances **AY** and **YX**.
- Theory predicts that **AY = YX**. Suggest a reason why, in spite of carrying out the experiment with care, your values of **AY** and **YX** may be slightly different.
- State and explain the reason for **one** precaution that you took to gain an accurate result.

Tie your ray trace sheet in front of page 6 of the Answer Booklet.

- 4 In this experiment, you will investigate the voltage across a wire.

Record all of your observations and answers on page 8 of your Answer Booklet.

Carry out the following instructions referring to Fig 4.1, which shows the circuit that has been set up for you.

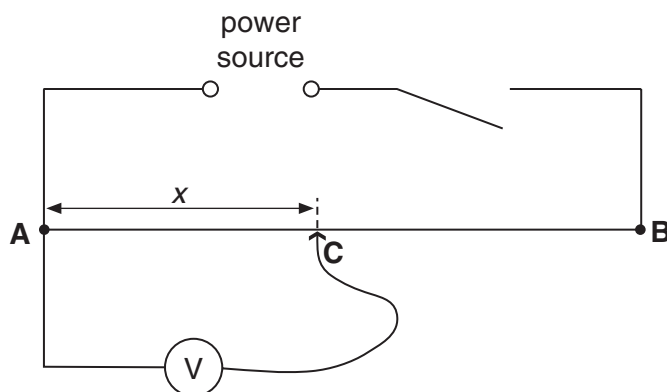


Fig. 4.1

- Place the sliding contact **C** on the resistance wire **AB** at a distance x from **A** where $x = 0.200$ m.
- Record the value of x .
- Switch on and, using the voltmeter, record the voltage V across **AC**.
- Take the sliding contact away from the wire **AB** and switch off.
- Calculate the voltage k per unit length of the wire using the equation

$$k = \frac{V}{x}.$$

- Repeat steps **(b)**–**(e)** with the sliding contact at distances of $x = 0.400$ m and $x = 0.800$ m from **A**.
- Complete the column headings in the table.
- Within the limits of experimental error, what do you conclude about the variation of voltage with distance along the wire? Justify your conclusion by reference to your table of results.

