

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICS

0625/05

Paper 5 Practical Test

October/November 2005

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 **7** printed pages, **1** blank page and an inserted Answer Booklet.

- 1 In this experiment you are to investigate the effect of a load on a rule attached to a spring. Record all your observations on pages 2 and 3 of your Answer Booklet. Carry out the following instructions, referring to Fig. 1.1. The apparatus has been set up for you.

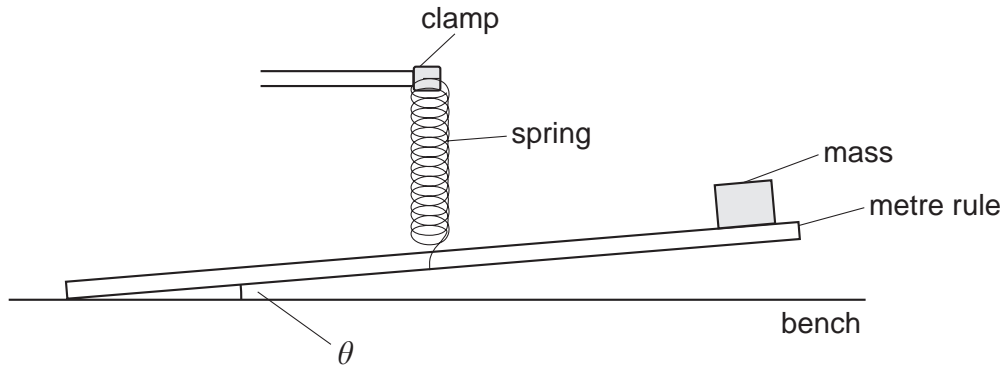


Fig. 1.1

The rule has one end taped to the bench so that it does not slip. The rule is attached to a spring. Do **not** change the position of the spring.

- (a) Place a mass $m = 10\text{ g}$ on the rule at the 90.0 cm mark.
- (b) Measure and record the angle θ between the rule and the bench.
- (c) Repeat steps (a) – (b) using mass values of 20 g , 30 g , 40 g and 50 g .
- (d) Complete the column headings in the table.
- (e) A student suggests that θ is directly proportional to m . State with a reason whether or not your results support this suggestion.

- (f) A student carried out this experiment using a 360° protractor, as shown in Fig. 1.2. Explain how the student could use this protractor to measure the angle θ between the metal rod and the bench. You may draw a diagram if you wish.

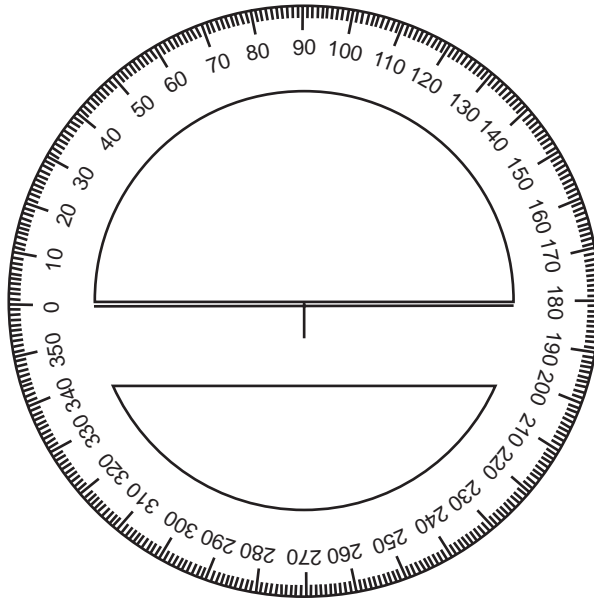


Fig. 1.2

- (g) The range of angles measured in this experiment may be quite small. Using the same apparatus, with the masses and spring in the same positions, suggest another method of investigating as reliably as possible the extent by which the rule is pulled down by the masses. This method must not use a protractor but an additional rule may be used. You may draw a diagram if you wish.

- 2 In this experiment you are to investigate the resistance of resistance wire in different arrangements.

Record all your observations and readings on page 3 of your Answer Booklet.

The circuit shown in Fig. 2.1 has been set up for you. The circuit includes only section **AB** of the resistance wire.

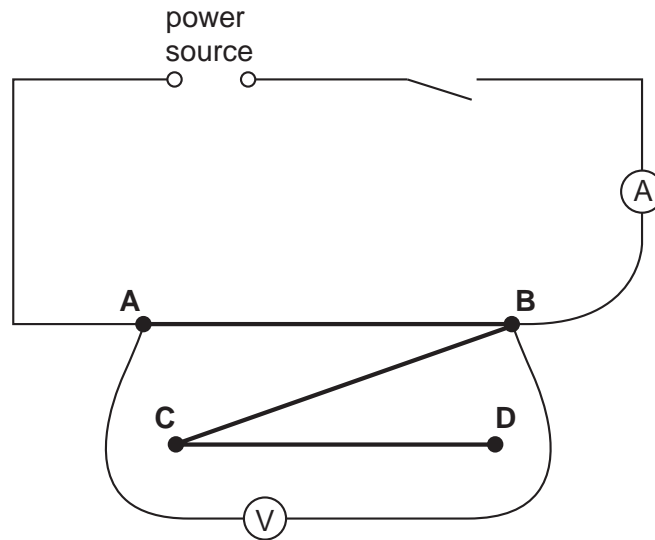


Fig. 2.1

- (a) Switch on. Measure and record in the table the current I in the circuit and the p.d. V across the section of resistance wire. Switch off.
- (b) Calculate the resistance R using the equation

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

Record this value of R in the table.

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

- (d) Adjust the circuit to include section **AC** of the resistance wire, as shown in Fig. 2.2.

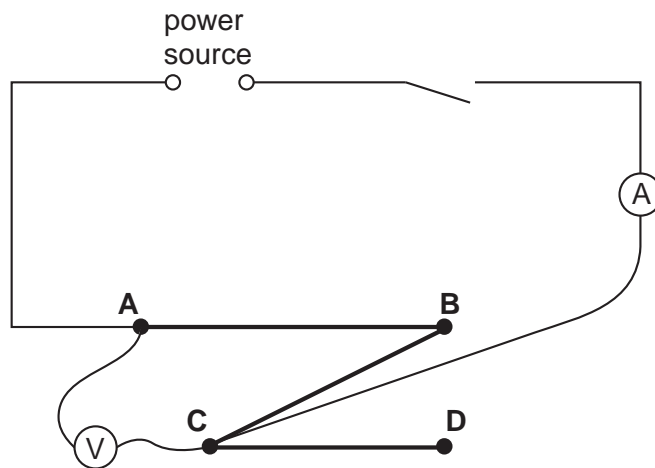


Fig. 2.2

- (e) Repeat steps (a) and (b).
- (f) Use a connecting lead to connect **A** to **D**. The rest of the circuit should stay as shown in Fig. 2.2.
- (g) Repeat steps (a) and (b).
- (h) Draw a circuit diagram, using standard symbols, showing the circuit described in (f). Use the symbol for a resistor to represent each section **AB**, **BC** and **CD** of the resistance wire.

- 3 In this experiment you are to investigate the effect of insulation on the rate of cooling

Record all your observations on pages 4 and 5 of your Answer Booklet.

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

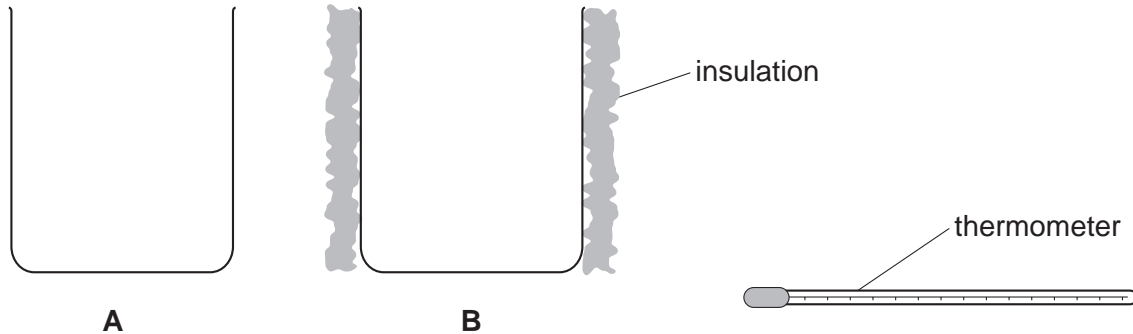


Fig. 3.1

You are provided with two beakers labelled **A** and **B**. Beaker **B** is insulated. Do **not** remove this insulation. You also have a supply of hot water.

- (a) Pour hot water into beaker **A** until it is approximately two thirds full.
- (b) Measure the temperature θ of the hot water. Record this temperature in the table for time $t = 0$ s.
- (c) Start the stopwatch and then record the temperature of the water at 30 s intervals for a total of four minutes.
- (d) Complete the column headings in the table.
- (e) Use the data in the table to plot a graph of θ (y -axis) against t (x -axis). Draw the best fit curve.
- (f) Repeat steps (a) – (d) using beaker **B**.
- (g) Use the data obtained from part (f) to plot another curve on the same graph axes that you used for part (e).
- (h) The experiment you have just done was designed to investigate the effect of insulation on the rate of cooling. Suggest two improvements that could be made to the design of the experiment.

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

Record all your observations on pages 6 and 7 of your Answer Booklet.

Carry out the following instructions, referring to Fig. 4.1.

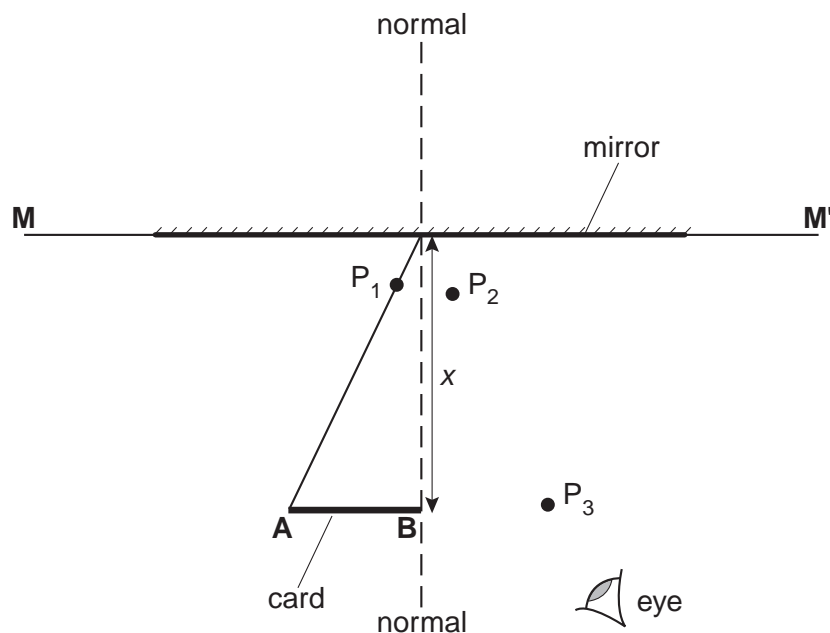


Fig. 4.1

- On page 7 of the Answer Booklet, the line **MM'** shows the position of the mirror. Draw a normal to this line at its centre.
- Place page 7 of the Answer Booklet on the pin board. Place the mirror, with its reflecting face vertical, on the line **MM'**.
- Place the card so that it stands vertically with end **B** on the normal line and at a distance $x = 5.0$ cm from the mirror. The card must be parallel to the mirror.
- Draw a line from the edge **A** of the card to the point where the normal meets the line **MM'**. Place a pin P_1 in this line, close to **MM'**. Label the position of P_1 .
- View the image of the edge **A** of the card in the mirror and position two pins P_2 and P_3 some distance apart so that pins P_3 , P_2 , P_1 and the edge **A** of the card all appear exactly one behind the other. Label the positions of P_2 and P_3 .
- Remove the pins and the mirror and draw in the line joining the positions of P_2 and P_3 . Continue the line until it meets the normal.
- Measure and record the angle of reflection r between the normal and line P_2P_3 .
- Repeat the steps (c) – (g) using values of x of 10.0 cm and 15.0 cm.
- In spite of carrying out this experiment with care, it is possible that the values of the angle of reflection r will not be exactly the same as the values obtained from the theory. Suggest two possible causes of this inaccuracy.

