UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER							CANDIDATE NUMBER				

PHYSICS **0625/05**

Paper 5 Practical Test **October/November 2009**

1 hour 15 minutes

Candidates answer on the Question Paper

Additional Materials: As listed in the Confidential Instructions

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of the page.
Write in dark blue or black pen.
You may use a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

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	
Total	

This document consists of **11** printed pages and **1** blank page.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

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

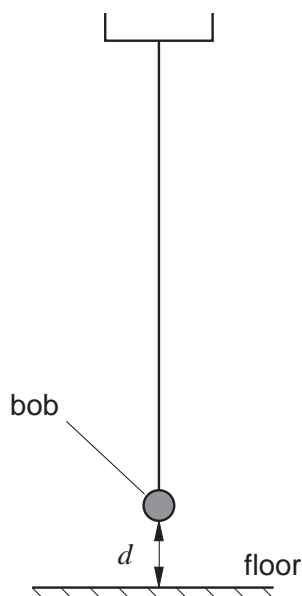Carry out the following instructions referring to Fig. 1.1 and Fig. 1.2.
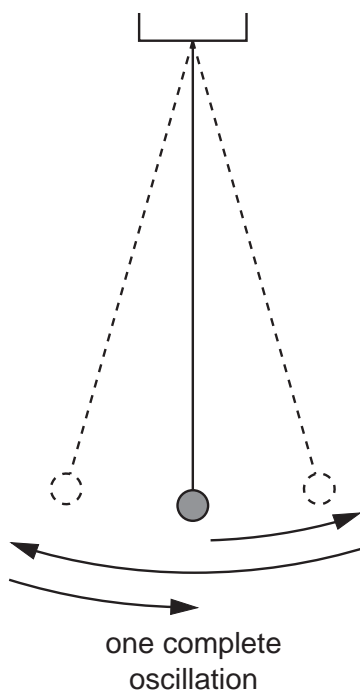

| **Fig. 1.1** | **Fig. 1.2** |

The pendulum has been set up for you. Do not adjust the position of the clamp supporting the pendulum.

(a) Measure and record in Table 1.1 the vertical distance d from the floor to the bottom of the pendulum bob.

(b) Displace the pendulum bob slightly and release it so that it swings. Measure and record in Table 1.1 the time t for 20 complete oscillations of the pendulum (see Fig. 1.2).

(c) Calculate the period T of the pendulum. The period is the time for one complete oscillation. Record the value of T in Table 1.1.

(d) Without changing the position of the clamp supporting the pendulum, adjust the length until the vertical distance d from the floor to the bottom of the pendulum bob is about 20 cm. Measure and record in Table 1.1 the actual value of d to the nearest 0.1 cm. Repeat steps **(b)** and **(c)**.

(e) Repeat steps **(d)** using d values of about 30 cm, 40 cm and 50 cm.

Table 1.1

d/cm	t/s	T/s

[4]

(f) Plot a graph of T/s (y-axis) against d/cm (x-axis).
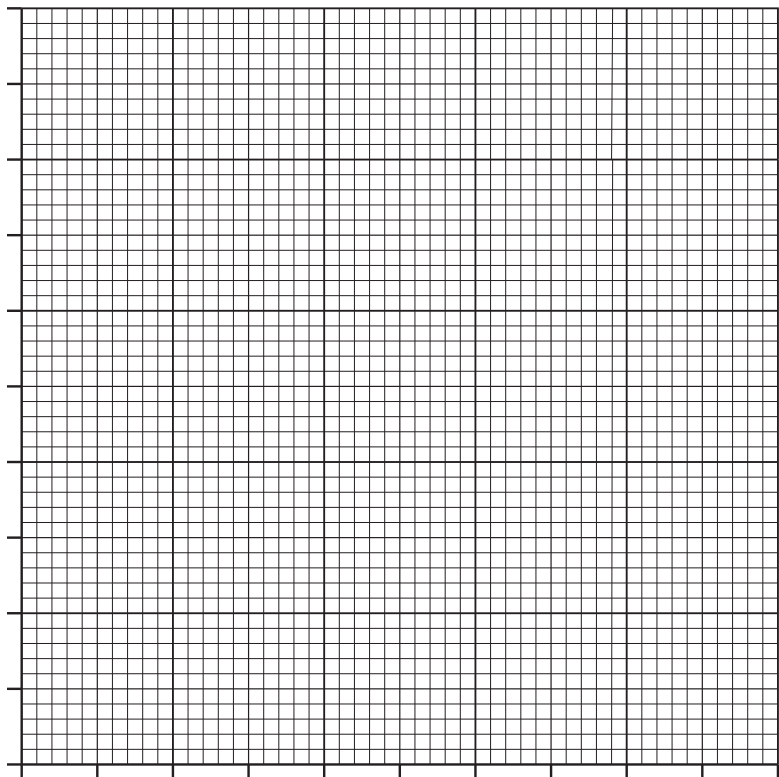
[5]

(g) State whether or not your graph shows that T is directly proportional to d. Justify your statement by reference to the graph.

Statement ....

Justification ....

.... [1]

2 In this experiment you will investigate the cooling of thermometer bulbs under d[...] conditions.

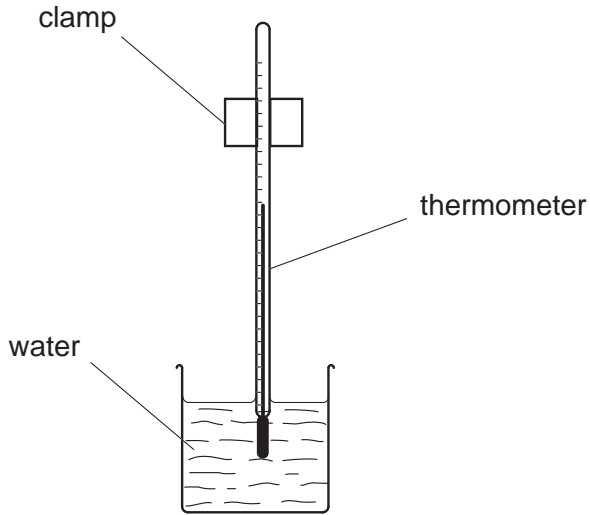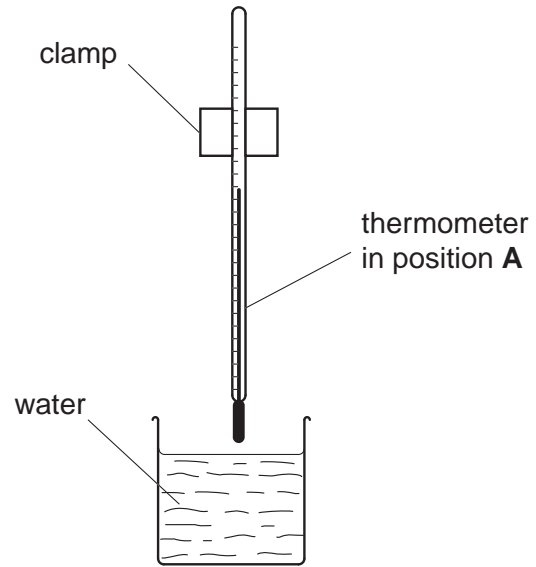Carry out the following instructions referring to Fig. 2.1, 2.2 and 2.3.
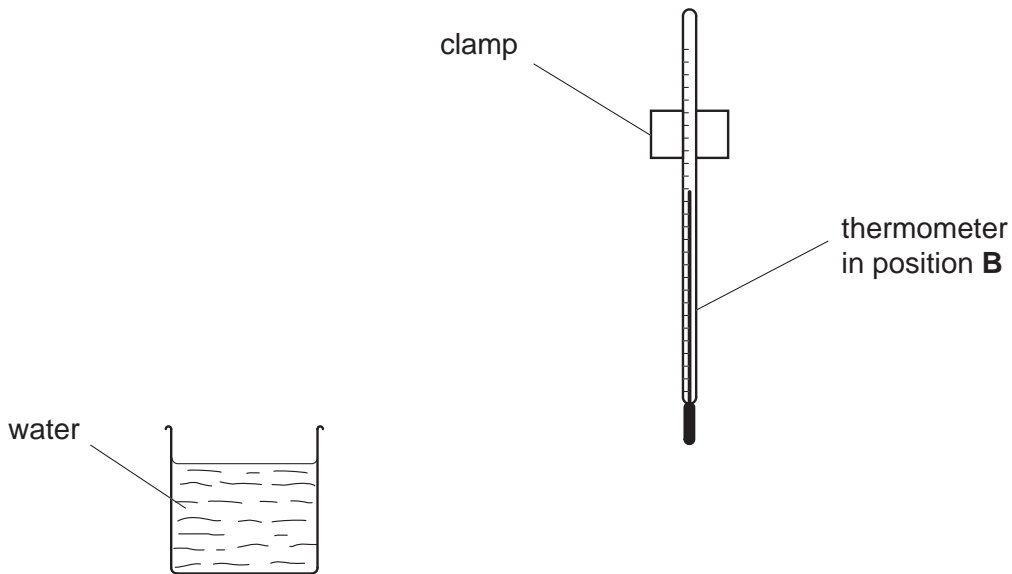

Fig. 2.1

Fig. 2.2

Fig. 2.3

(a) Place the thermometer in the beaker of hot water (See Fig. 2.1).

(i) Record the temperature θ_h of the hot water.

θ_h .... [1]

(ii) Move the thermometer until the thermometer bulb is just above the surface [of the] water (Position **A**) as shown in Fig. 2.2 and immediately start the stopclock.

(iii) After 30 s measure the temperature θ shown on the thermometer. Record the time t (30 s) and the temperature reading in Table 2.1.

(iv) Continue recording the time and temperature readings every 30 s until you have six sets of readings.

Table 2.1

	Position **A**	Position **B**
t /	θ/	θ/

[5]

(b) Complete the column headings in the table.

(c) Replace the thermometer in the beaker of hot water and record its temperature.

θ_h .... [1]

(d) Move the thermometer at least 10 cm away from the beaker to position **B** as shown in Fig. 2.3 and immediately start the stopclock.

(i) After 30 s measure the temperature θ shown on the thermometer. Record the temperature reading in Table 2.1.

(ii) Continue recording the temperature every 30 s until you have six sets of readings.

(e) State in which position the thermometer bulb cooled more quickly. Justify your answer by reference to your readings.

Statement ....

Justification ....

.... [1]

(f) To make a fair comparison between the rates of cooling of the thermometer bulbs in the two positions it is important to control other experimental conditions. Suggest two conditions that should be controlled in this experiment.

1 ....

2 .... [2]

3 In this experiment, you are to compare the combined resistance of lamps arranged in [...] and in parallel.

Carry out the following instructions, referring to Fig. 3.1 and Fig. 3.2.
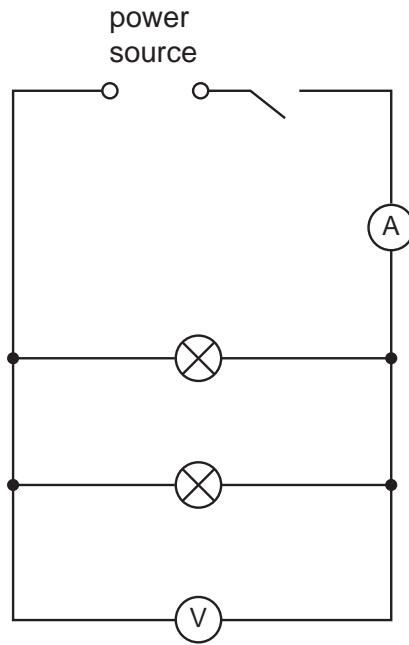
The circuit shown in Fig. 3.1 has been set up for you.
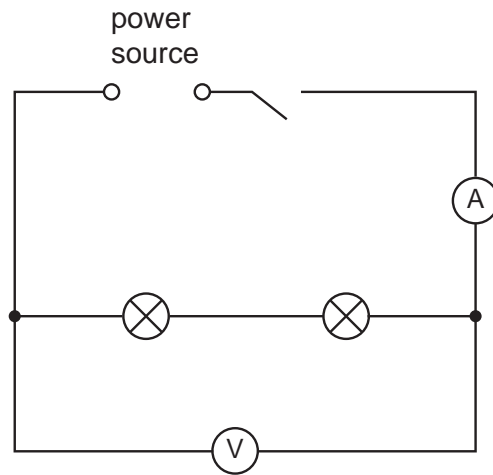
power
source

A

V

Fig. 3.1

(a) Switch on. Measure and record in Table 3.1 the current I in the circuit and the p.d. V across the two lamps. Switch off.

(b) Calculate the combined resistance R of the two lamps using the equation

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

Record this value of R in Table 3.1.

Table 3.1

	V /	I /	R /
Fig. 3.1			
Fig. 3.2			

[4]

(c) Complete the column headings in the table.

(d) Disconnect the lamps and the voltmeter. Set up the circuit shown in Fig. 3.2.

Fig. 3.2

(e) Switch on. Measure and record in Table 3.1 the current I in the circuit and the p.d. V across the two lamps. Switch off.

(f) Calculate the combined resistance R of the two lamps using the equation

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

Record this value of R in Table 3.1.

(g) Using the values of resistance obtained in **(b)** and **(f)**, calculate the ratio y of the resistances using the equation

$$y = \frac{\text{resistance of lamps in series}}{\text{resistance of lamps in parallel}}.$$

y = ... [3]

Question 3 continues on the next page

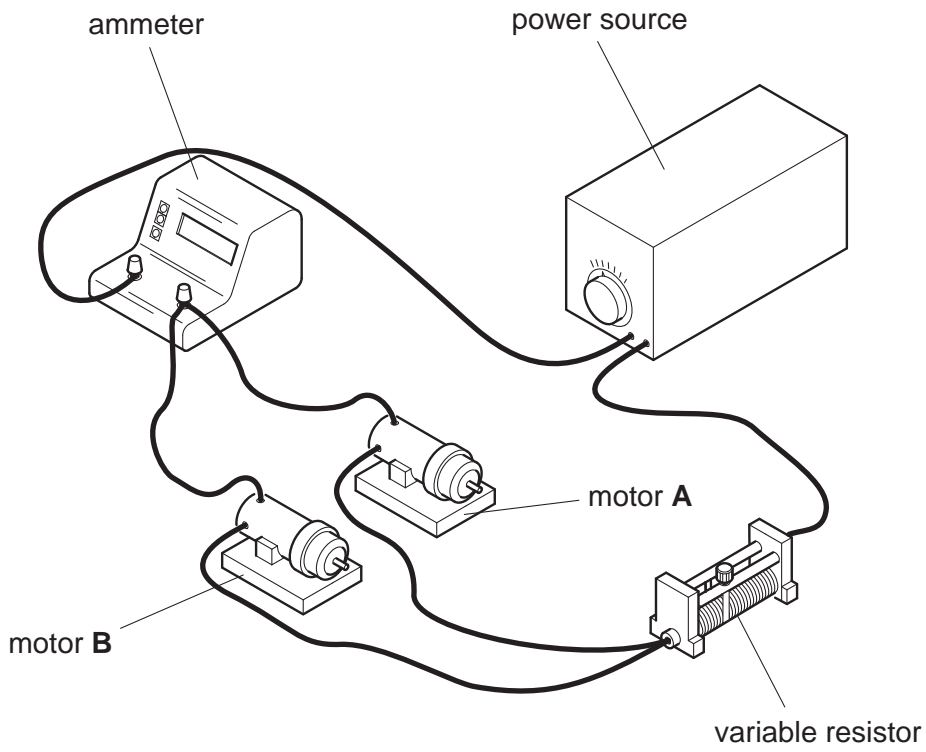**(h)** **(i)** Fig. 3.3 shows a circuit including two motors **A** and **B**.

Fig. 3.3

Draw a diagram of the circuit using standard circuit symbols. The circuit symbol for a motor is:

—(M)—

An engineer wishes to measure the voltage across motor **A**.

(ii) On Fig. 3.3 mark with the letters **X** and **Y** where the engineer should connect th........
voltmeter.

(iii) State the purpose of the variable resistor ....

....

.... [3]

4 In this experiment you will determine the focal length of a converging lens by two d____ methods.

Carry out the following instructions referring to Fig. 4.1. and Fig. 4.2.
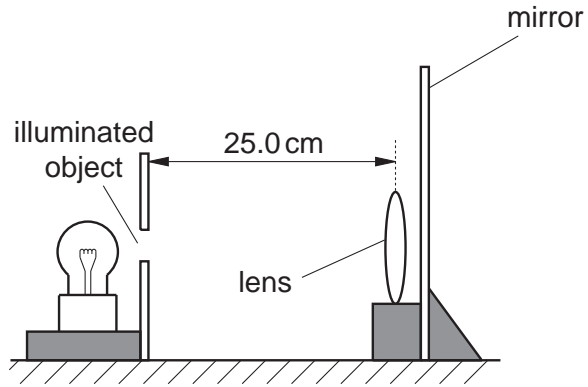
Method 1

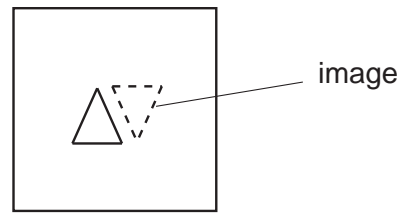
Fig. 4.1   **Fig. 4.2**

(a) Place the lens about 25 cm from the object screen and close to the mirror as shown in Fig. 4.1.

(b) Move the lens and the mirror slowly towards the object screen until a sharply focused image is obtained on the object screen as shown in Fig. 4.2.

(c) Measure the distance between the lens and the object screen. This distance is equal to the focal length f of the converging lens. Record f below.

f = ... [2]

Method 2

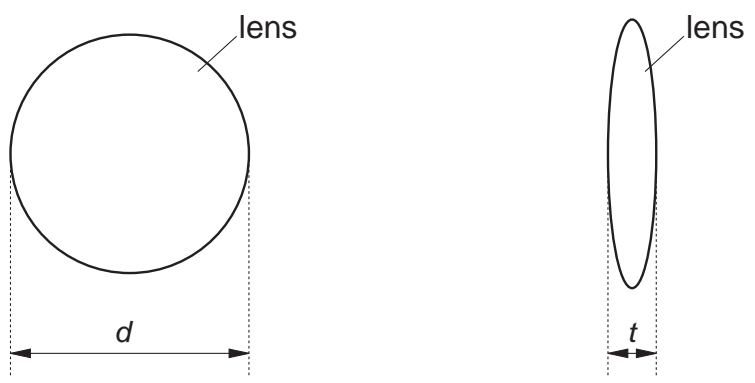Carry out the following instructions referring to Fig. 4.3.

Fig. 4.3

(d) Remove the lens from its holder. By placing the lens on the metre rule, deter average value for the diameter *d* of the lens. Record your readings in the space be

d = ... [3]

(e) Using the two blocks of wood and the metre rule determine the thickness *t* of the lens.

t = ... [1]

(f) Draw a diagram to show how you used the two blocks of wood and the metre rule with the lens.

[2]

(g) (i) Theory shows that for a perfectly formed lens the focal length is given by the formula

$$f = \frac{d^2}{kt}$$ where *k* = 4.16.

Calculate the focal length *f* of the lens using this formula.

f = ... [1]

(ii) Explain whether your results from Methods 1 and 2 support this theory.

....

....

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