Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

PHYSICS **5054/04**

Paper 4 Alternative to Practical

October/November 2005

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 the work you hand in.
Write in dark blue or black pen in the spaces provided on the Question Paper.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
You may use a soft pencil for any diagrams, graphs or rough working.
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 **9** printed pages and **3** blank pages.

BLANK PAGE

1 The resistance of a light-dependent resistor (LDR) decreases when the intensity of t shining on it increases.

Fig. 1.1 shows a circuit for a simple light-meter using an LDR and an ammeter.

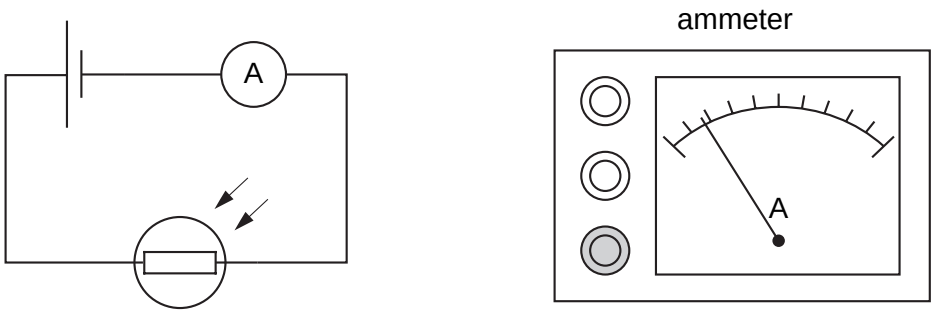


Fig. 1.1

(a) State and explain what happens to the reading on the ammeter as the light intensity increases.

.....

.....

..... [2]

(b) The ammeter has to be calibrated to read in units of light intensity.

Explain what is meant by the term *calibrated*.

.....

.....

..... [1]

2 A student measures the current in a light-dependent resistor (LDR) when light from a lamp shines on it. The apparatus is set up as shown in Fig. 2.1. The distance *d* is varied. The ammeter readings and the distances *d* are written roughly on a scrap of paper as shown in Fig. 2.2.

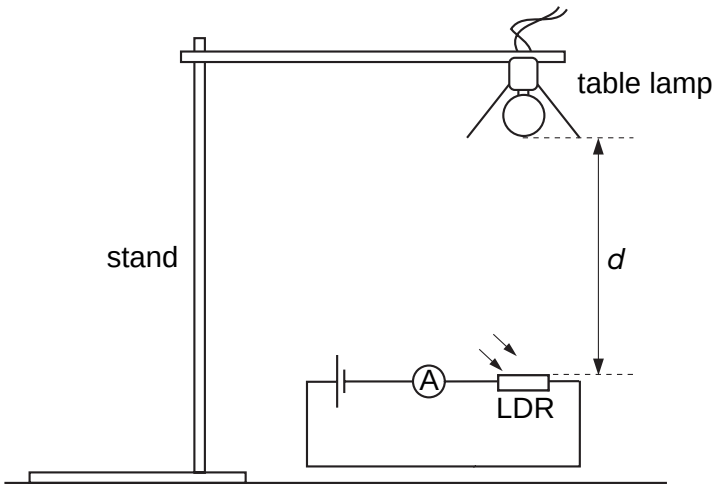


Fig. 2.1

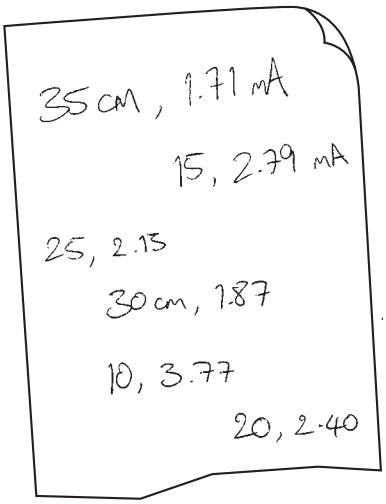


Fig. 2.2

(a) **(i)** The ammeter has different current ranges. Explain why these may be useful.

..... [1]

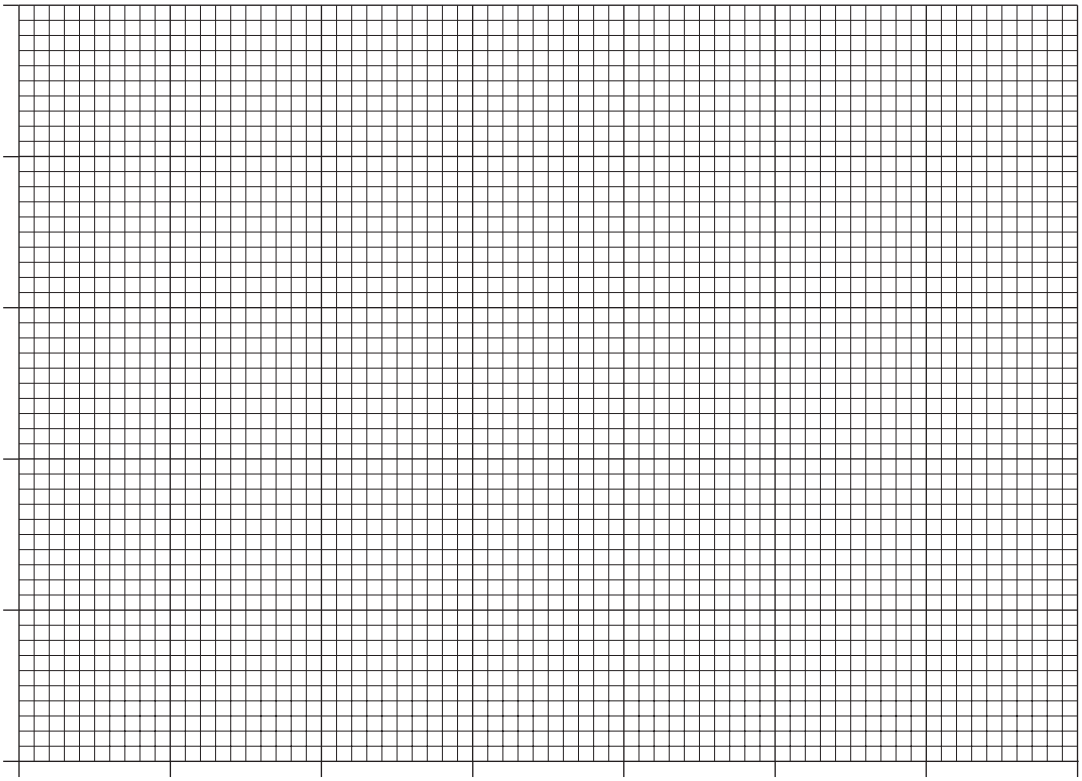
(ii) The student only uses one range. Suggest a possible value for the range that the student used.

..... [1]

(b) The student should have recorded the readings in a table. In the space below, draw a suitable table. Write the readings in the table.

[3]

(c) On the grid below, plot a graph of current on the *y*-axis against distance *d* on the *x*-axis.



[4]

(d) Describe the relationship between the current in the LDR and the distance *d* from the lamp.

..... [1]

(e) Suggest why it is difficult to measure the distance *d* accurately.

.....

.....

..... [1]

(f) The stand in Fig. 2.1 is not set up correctly. Explain why this arrangement may cause a problem.

..... [1]

3 A student is asked to measure the focal length *f* of a convex lens. A quick method is used first to obtain a rough estimate for *f*. This is followed by a more accurate experiment.

(a) For the quick estimate, the student forms a focused image of the Sun on a piece of card.

(i) In the space below, sketch a labelled diagram to show how *f* can be measured.

[1]

(ii) The student repeats the experiment in **(a)** using a window 4 m away instead of the Sun. State how this will affect the measurement obtained for *f*.

..... [1]

(b) For the more accurate experiment, the student uses the small illuminated object shown in Fig. 3.1. This object and a plane mirror are set up as shown in Fig. 3.2.

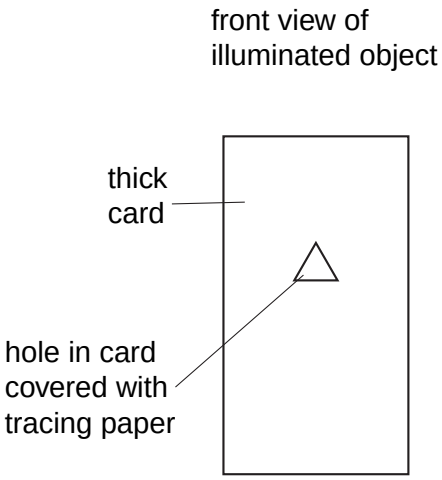


Fig. 3.1

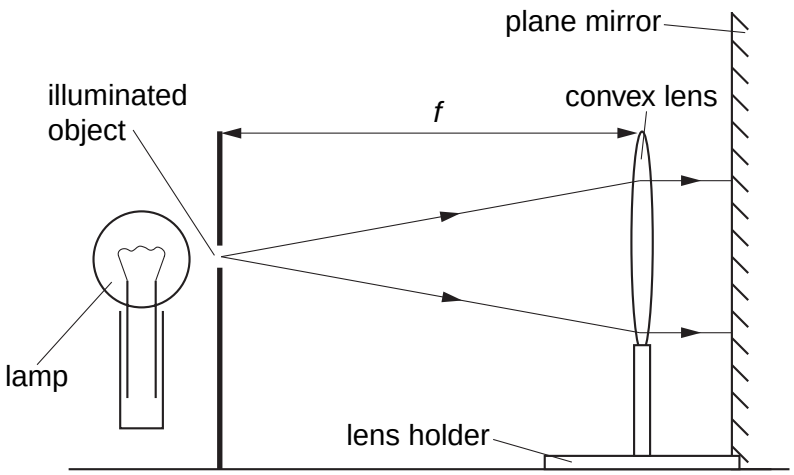


Fig. 3.2

(i) Two rays from the illuminated object to the mirror are shown on Fig. 3.2. Explain why a clear focused image of the illuminated object is seen beside the object on the card.

.....

..... [1]

(ii) State the effect on the image of

1. moving the mirror further away from the lens,

..... [1]

2. moving the lens towards the object.

..... [1]

4 A teacher demonstrates the effect of a change in pressure on the volume of a gas at constant temperature. The apparatus used is shown in Fig. 4.1.

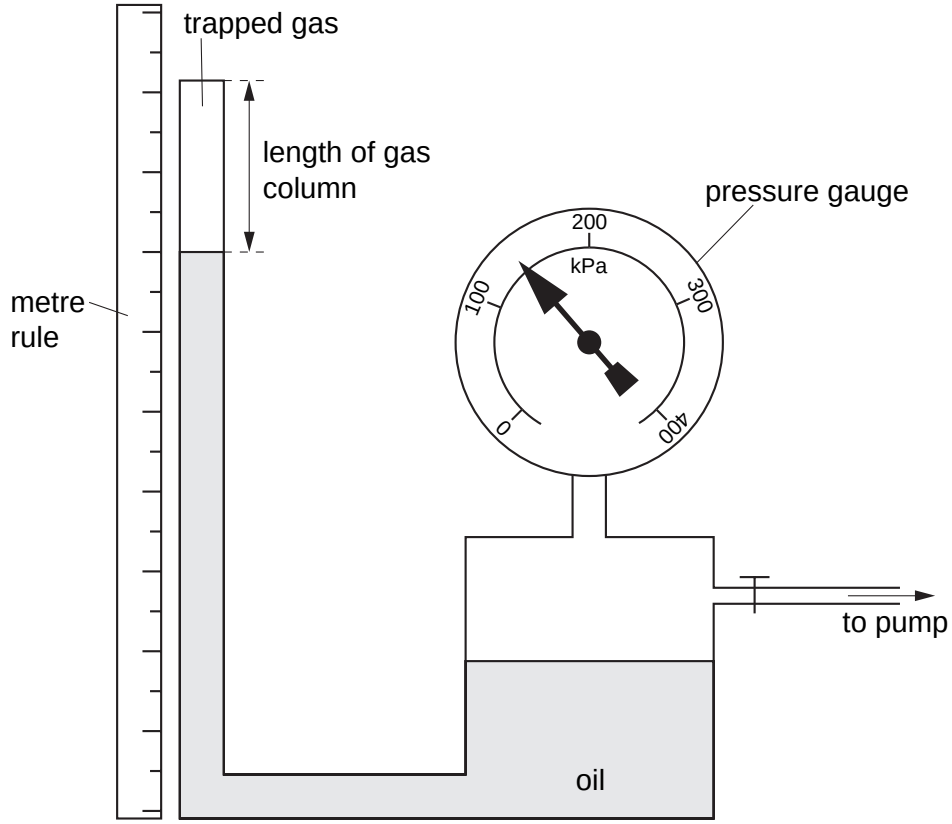


Fig. 4.1

At the beginning of the experiment, the pressure reading is 100 kPa and the length of the gas column is 35.8 cm.

(a) Explain why the volume of the gas is directly proportional to the length of the gas column.

..... [1]

(b) The teacher uses the pump to increase the pressure on the gas. Explain why the apparatus should be left for a few minutes before the length of the gas column is measured.

..... [1]

(c) The pressure is now 200 kPa and the length of the gas column is 17.9 cm.

The teacher states that the pressure of the gas is inversely proportional to the length of the gas column. Show that these readings agree with the teacher's statement.

[1]

(d) State the reason for placing the metre rule as close to the glass tube as possible when the length of the gas column is measured.

.....

..... [1]

5 A student wishes to measure the maximum temperature of a bunsen flame. A brass cube of side 1 cm and a beaker of water are used. Tongs are used to hold the brass cube in the flame. The cube is then transferred into a beaker of cold water. The apparatus is shown in Fig. 5.1.

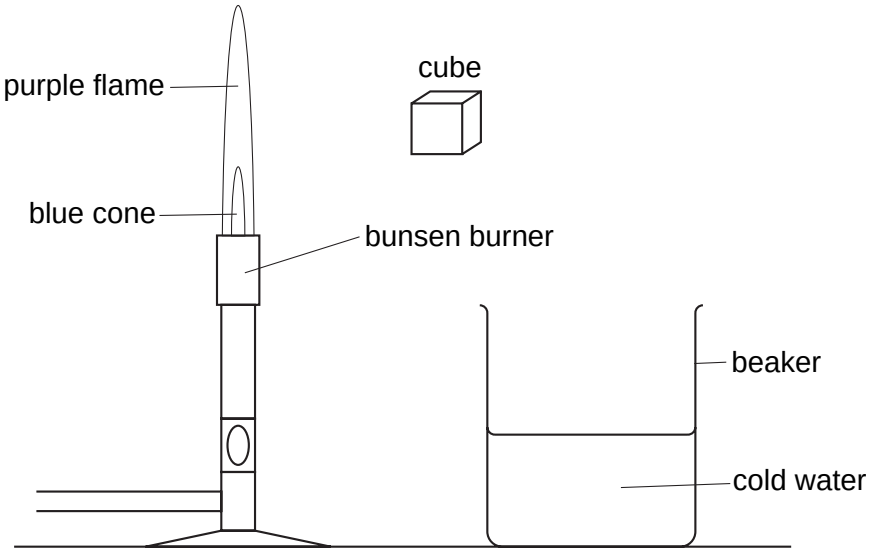


Fig. 5.1

(a) Suggest one reason for using a cube made from a metal such as brass in this experiment.

.....

..... [1]

(b) In order to calculate the temperature of the flame, the student needs to know the specific heat capacities of brass and of water. The mass of the brass cube and the mass of water in the beaker are measured. What other measurements have to be made?

.....

..... [2]

(c) State two sources of error in the experiment.

1. .....

.....

2. .....

..... [2]

(d) Suggest a method of reducing one of the sources of error given in **(c)**.

.....

..... [1]

BLANK PAGE

BLANK PAGE