Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICS **0625/02**

Paper 2

May/June 2005

1 hour 15 minutes

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.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

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.
You may lose marks if you do not show your working or if you do not use appropriate units.
Take the weight of 1 kg to be 10 N (i.e. acceleration of free fall = 10 m/s^2).

For Examiner's Use

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

This document consists of **16** printed pages.

For Examiner's Use

1 **(a)** A measuring cylinder contains 100 cm^3 of water. 20 cm^3 of the water is poured into a beaker.

On Fig. 1.1, mark the level of the water left in the cylinder. [2]

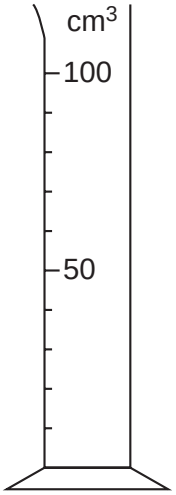

Fig. 1.1

(b) A rule, calibrated in cm, is placed alongside the measuring cylinder, as shown in Fig. 1.2.

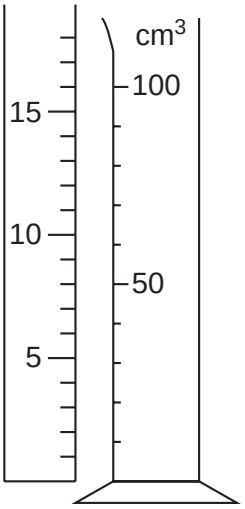

Fig. 1.2

(i) What is the length of the measuring cylinder, from zero up to the 100 cm^3 mark?

.....

(ii) The volume of a cylinder is found using the equation

volume = cross-sectional area × length.

Calculate the cross-sectional area of the measuring cylinder.

cross-sectional area = ...

[5]

For Examiner's Use

2 A boat sails along a river, stopping at various places along the way. Fig. 2.1 shows how the speed of the boat changes during the day, starting at 0900 hrs and reaching its final destination at 2100 hrs.

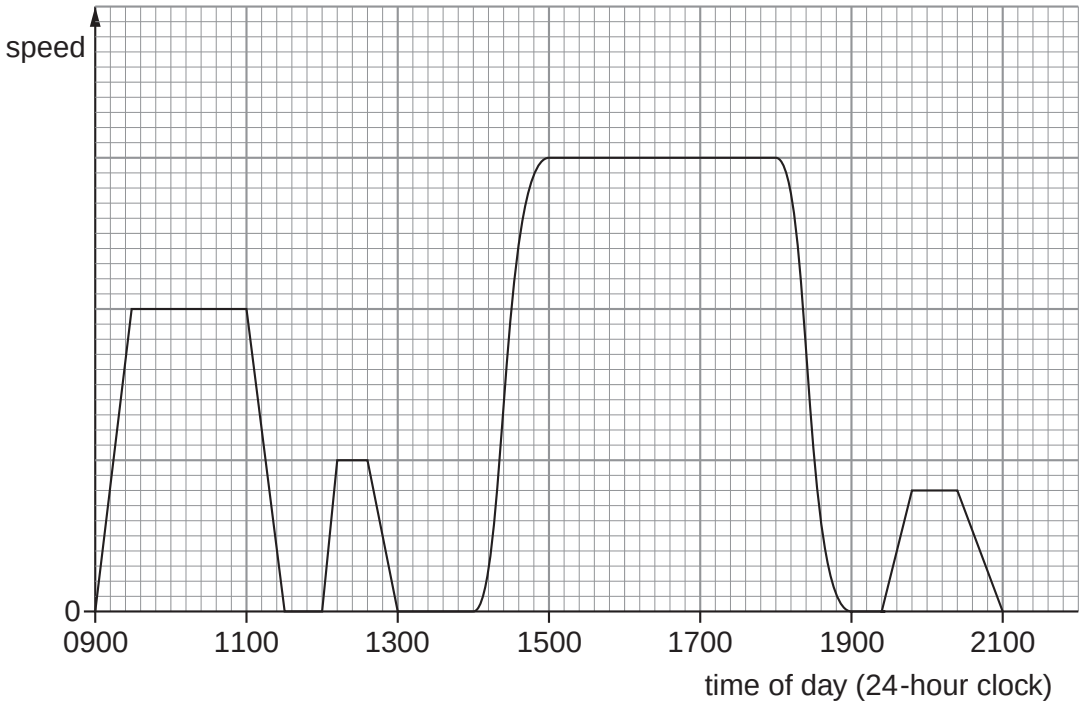

Fig. 2.1

(a) Calculate how long the whole journey takes.

time taken = ... hours [2]

(b) State the time of day at which the boat reaches its greatest speed.

time of day = ... [1]

(c) State the longest time for which the boat was stationary at one place.

longest time = ... hours [1]

(d) If the speed axis had values marked on it, state

(i) how the graph could be used to find the distance travelled between 0900 hrs and 1130 hrs,

.....

.....

(ii) how the average speed for the whole journey could be found.

.....

.....

[3]

For Examiner's Use

3 **(a)** A light vertical triangular piece of rigid plastic PQR is pivoted at corner P.

A horizontal 5 N force acts at Q, as shown in Fig. 3.1.

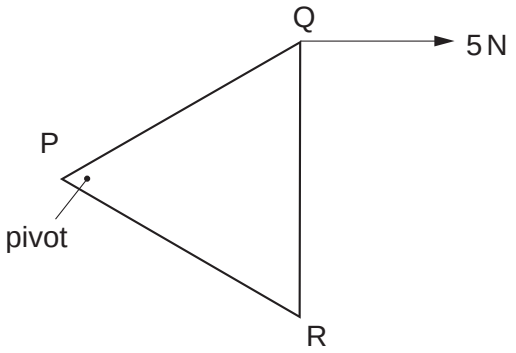

Fig. 3.1

Describe what, if anything, will happen to the piece of plastic.

.....

..... [2]

(b) On another occasion, two horizontal 5 N forces act on the piece of plastic, as shown in Fig. 3.2.

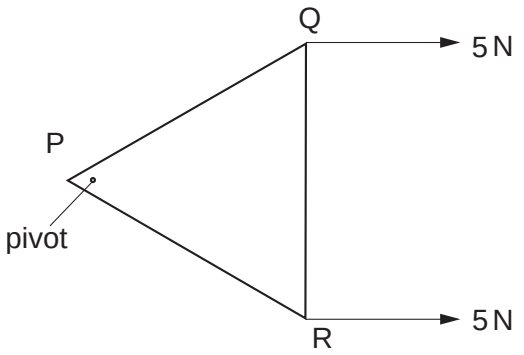

Fig. 3.2

(i) Describe what, if anything, will happen to the piece of plastic.

.....

(ii) On Fig. 3.2, mark the force that the pivot exerts on the piece of plastic. Show the direction of the force by means of an arrow and write the magnitude of the force next to the arrow. [4]

For Examiner's Use

4 Fig. 4.1 represents a hydroelectric system for generating electricity.

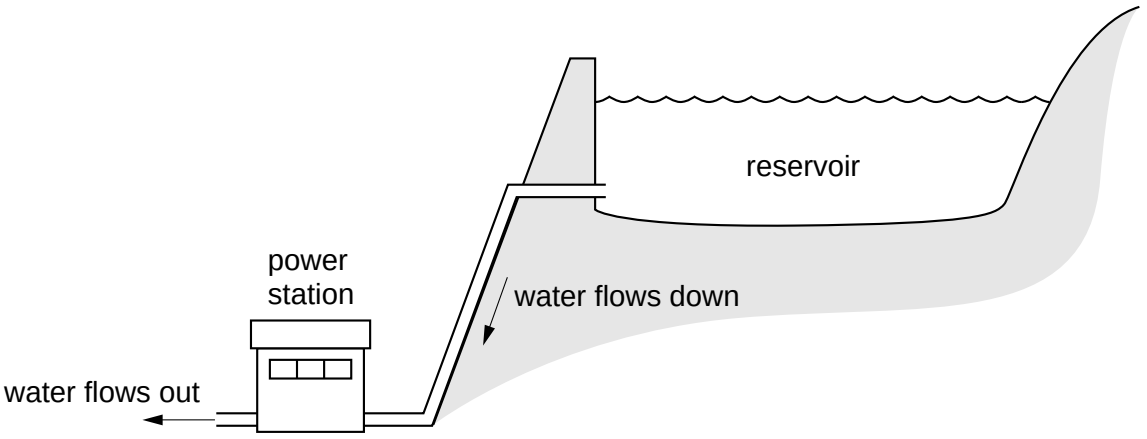

Fig. 4.1

Answer the following questions, using words from this list.

chemical electrical gravitational internal (heat)

kinetic light nuclear sound strain

(a) What sort of energy, possessed by the water in the reservoir, is the main source of energy for this system?

..... [1]

(b) When the water flows down the pipe, it is moving. What sort of energy does it possess because of this movement?

..... [1]

(c) The water makes the turbines in the power station rotate. What sort of energy do the turbines possess because of their rotation?

..... [1]

(d) What sort of energy does the power station generate?

..... [1]

(e) None of the energy transfer processes is perfect. In what form is most of the wasted energy released?

..... [1]

For Examiner's Use

5 **(a)** On a hot day, a child drinks all the water in a plastic bottle. She then screws the cap back tightly on the bottle, so that the bottle contains only air.

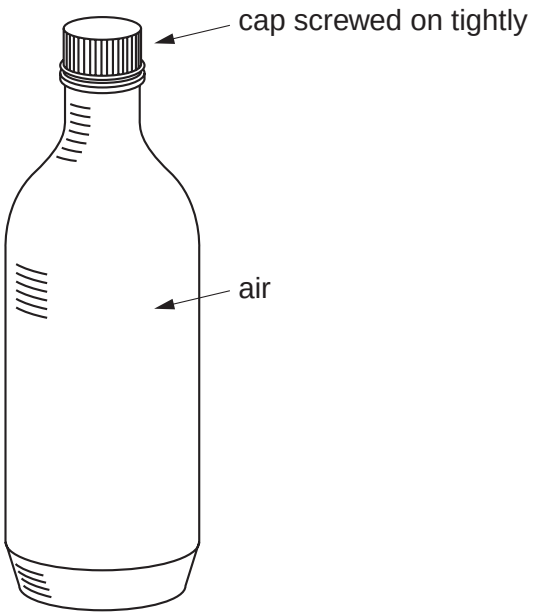

Fig. 5.1

She throws the bottle into a waste basket, where the Sun shines on it.

After a while in the Sun's rays, the air in the bottle is much hotter than before.

(i) State what has happened to the pressure of the air in the bottle.

.....

(ii) In terms of the behaviour of the air molecules, explain your answer to **(a)(i)**.

.....

.....

.....

.....

[5]

For Examiner's Use

(b) Also in the waste basket is a broken glass bottle containing a small quantity of water, as shown in Fig. 5.2.

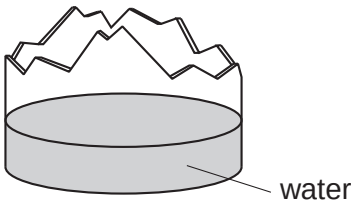

Fig. 5.2

As the Sun shines on it, the volume of water slowly decreases.

(i) State the name of the process causing this decrease.

.....

(ii) In terms of the effect of the Sun's rays on the water molecules, explain your answer to **(b)(i)**.

.....

.....

.....

.....

[4]

For Examiner's Use

6 The table below shows the potential difference (p.d.) needed at different times during a day to cause a current of 0.03 A in a particular thermistor.

time of day (24-hour clock)	0900	1200	1500	1800
p.d. / V	15.0	9.9		7.5
resistance / Ω	500		210	250

(a) Calculate the two values missing from the table. You may use the space below for your working. Write your answers in the table.

[3]

(b) On Fig. 6.1, plot the four resistance values.

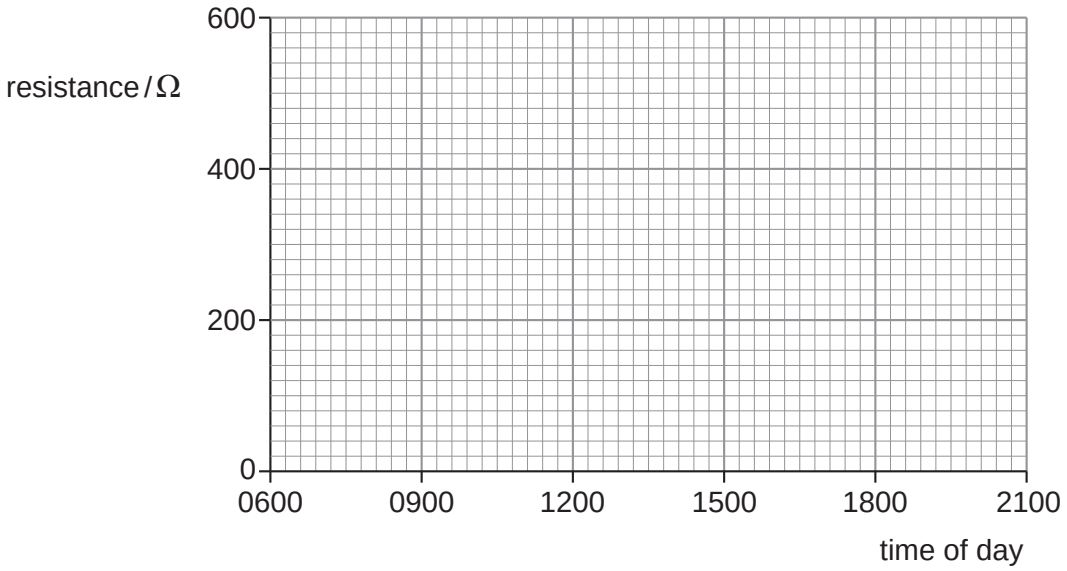

Fig. 6.1

[2]

(c) **(i)** Draw a smooth curve through your points.

(ii) Why do we draw a smooth curve rather than a series of straight lines joining the points?

.....

[2]

For Examiner's Use

(d) The thermistor is a circuit component with a resistance that decreases as the temperature increases.

(i) From your graph, estimate the time of day when the temperature was greatest.

time of day = ...

(ii) State the reason for your answer to **(d)(i)**.

.....

.....

[2]

For Examiner's Use

7 Fig. 7.1 shows the various regions of the electromagnetic spectrum.

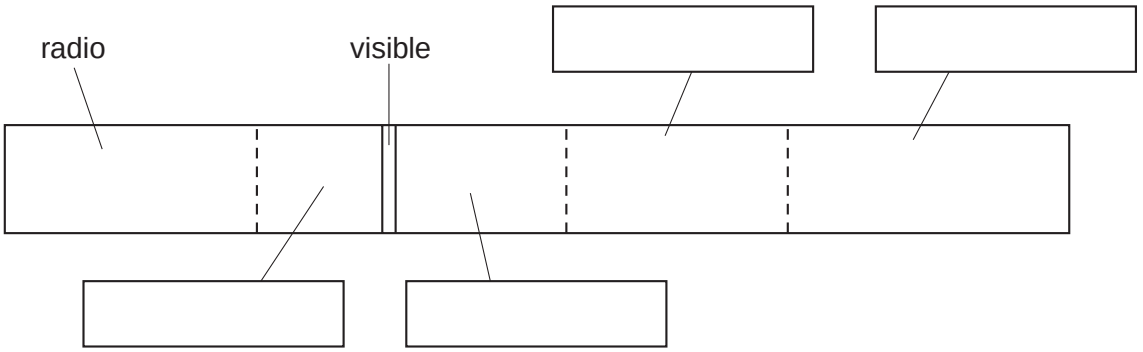

Fig. 7.1

Two of the regions have been labelled.

(a) In the boxes provided, write the names of the other regions. [4]

(b) Only one of the following types of wave is not an electromagnetic wave.

Tick one box to show which type of wave is **not** electromagnetic.

microwave ☐

radar ☐

sound ☐ [1]

For Examiner's Use

8 An inventor is trying to make a device to enable him to see objects behind him. He cuts a square box in half diagonally and sticks two plane mirrors on the inside of the box.

A side view of the arrangement is shown in Fig. 8.1.

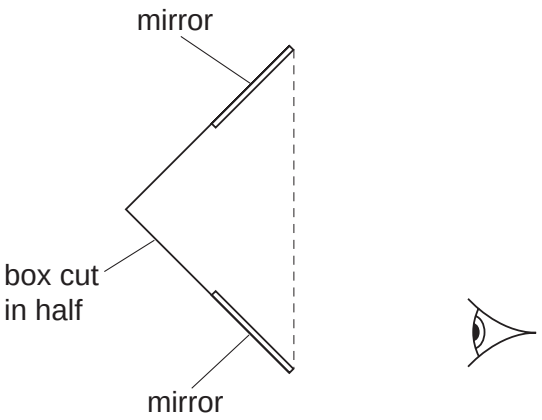

Fig. 8.1

Fig. 8.2 shows the arrangement, drawn larger.

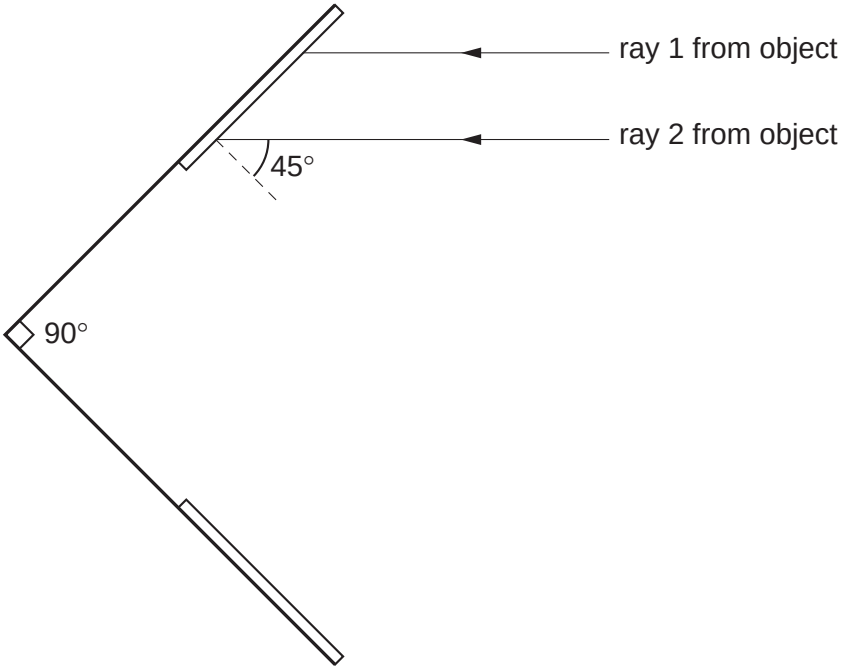

Fig. 8.2

Fig. 8.2 shows parallel rays from two different points on a distant object behind the man.

(a) Carefully continue the two rays until they reach the place where the inventor's head will be. [3]

(b) Look at what has happened to the two rays.

What can be said about the image the inventor sees?

..... [1]

For Examiner's Use

9 The speed of sound in air is 332 m/s. A man stands 249 m from a large flat wall, as shown in Fig. 9.1, and claps his hands once.

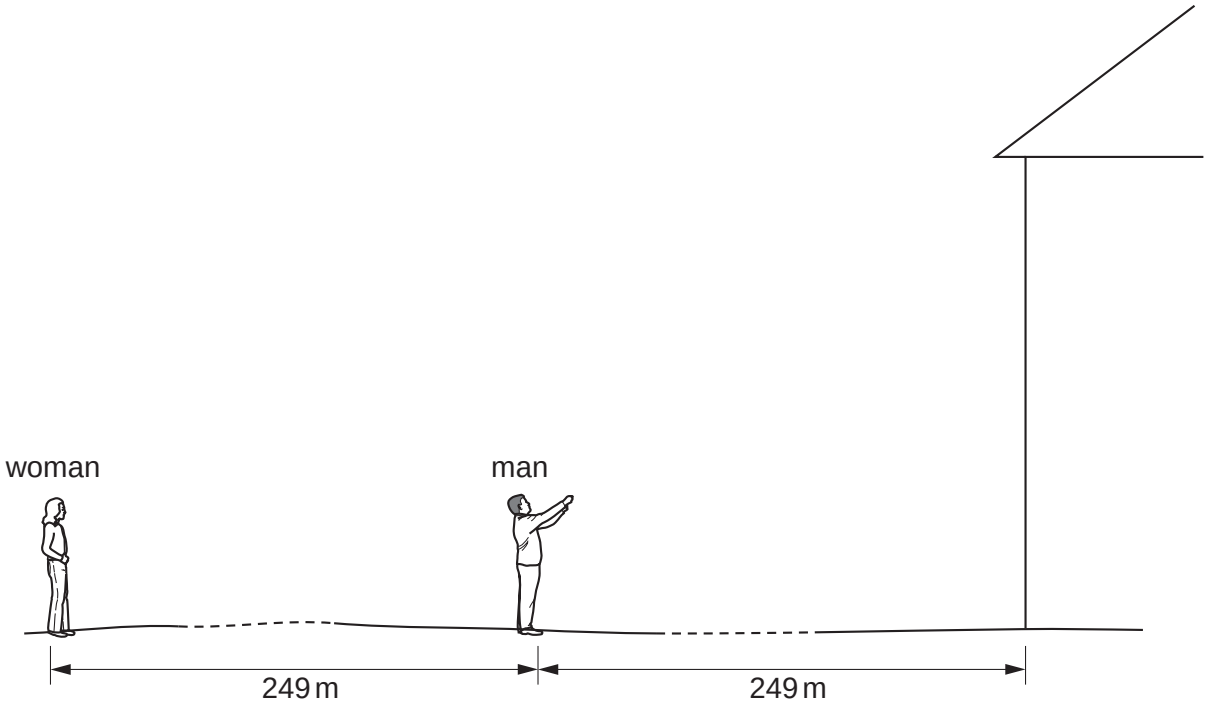

Fig. 9.1

(a) Calculate the interval between the time when the man claps his hands and the time when he hears the echo from the wall.

time interval = ... s [3]

(b) A woman is standing 249 m further away from the wall than the man. She hears the clap twice, once directly and once after reflection from the wall.

How long after the man claps does she hear these two sounds? Tick **two** boxes.

0.75 s ☐

1.50 s ☐

2.25 s ☐

3.00 s ☐ [2]

For Examiner's Use

10 (a) (i) What name do we give to the type of material that allows electrical charges to pass through it?

.....

(ii) Give an example of such a material.

.....

(iii) What must be done to this type of material in order to make electrical charges pass through it?

.....

.....

[3]

(b) (i) What name do we give to the type of material that does **not** allow electrical charges to pass through it?

.....

(ii) Give an example of such a material.

.....

[2]

(c) Which of the two types of material in **(a)(i)** and **(b)(i)** may be held in the hand and charged by friction (e.g. by rubbing with a soft cloth)?

..... [1]

For Examiner's Use

11 The circuit in Fig. 11.1 is connected up.

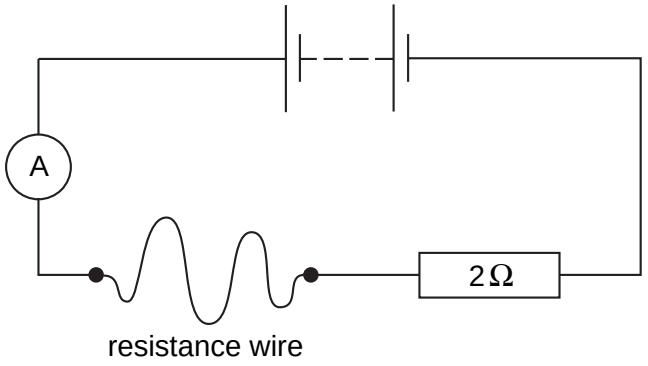

Fig. 11.1

(a) How does the current in the resistance wire compare with the current in the 2 Ω resistor? Tick one box.

smaller ☐ same ☐ greater ☐ [1]

(b) A voltmeter connected across the resistance wire shows the same reading as a voltmeter connected across the 2 Ω resistor.

State the value of the resistance of the resistance wire.

..... Ω [1]

(c) Calculate the combined resistance of the wire and the resistor.

combined resistance = ... Ω [2]

(d) The wire and resistor are disconnected and then reconnected in parallel, as shown in Fig. 11.2.

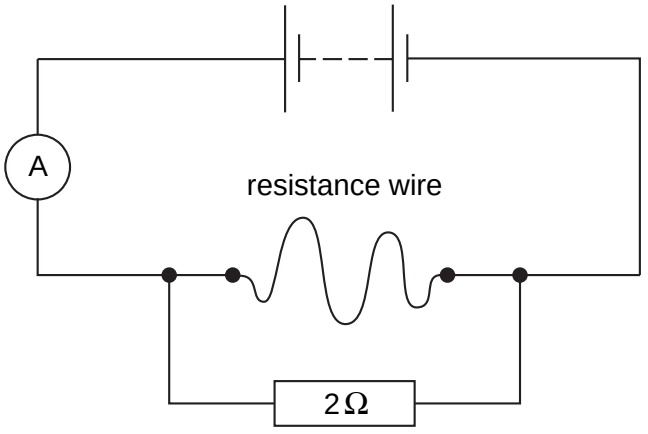

Fig. 11.2

For Examiner's Use

(i) What is the combined resistance of the wire and resistor in Fig.11.2? Tick one box.

zero ☐

1 Ω ☐

2 Ω ☐

3 Ω ☐

(ii) The ammeter in Fig. 11.1 reads 0.3 A. What is the reading on the ammeter in Fig. 11.2? Tick one box.

zero ☐

less than 0.3 A ☐

0.3 A ☐

more than 0.3 A ☐

[2]

(e) Walls in buildings sometimes develop cracks. The width of a crack can be monitored by measuring the resistance of a thin wire stretched across the crack and firmly fixed on either side of the crack, as illustrated in Fig. 11.3.

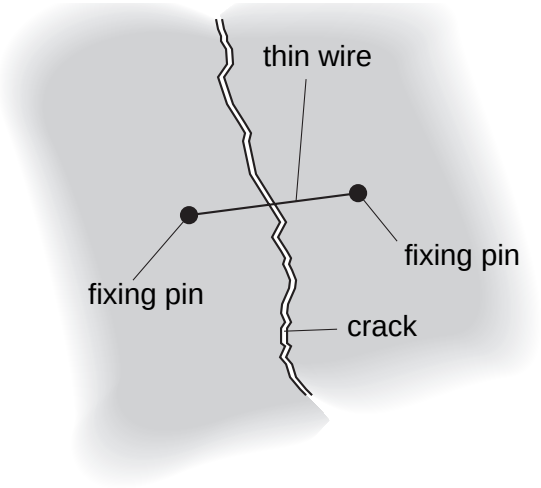

Fig. 11.3

The wall moves and the crack widens slightly.

State what happens to

(i) the length of the wire, ...

(ii) the resistance of the wire. .....

[2]

For Examiner's Use

12 (a) Complete the following table about the particles in an atom. The first row has been filled in as an example.

particle	mass	charge	location
proton	1 unit	+1 unit	in the nucleus
neutron			
electron			

[6]

(b) (i) Which of the particles in the table make up an α-particle?

.....

(ii) On the same scale as indicated by the table, state

1. the mass of an α-particle, ...

2. the charge of an α-particle. .....

[3]