Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICS **0625/02**

Paper 2

May/June 2004

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 **17** printed pages and **3** blank pages.

1 The clock on a public building has a bell that strikes each hour so that people who cannot see the clock can know what hour of the day it is.
At precisely 6 o'clock, the clock starts to strike. It strikes 6 times.
At the first strike of the bell, a man's wrist-watch is as shown in Fig. 1.1.

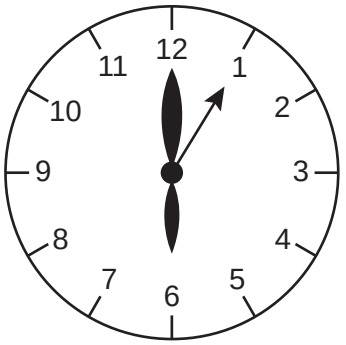

Fig. 1.1

When the bell strikes for the sixth time, the wrist-watch is as shown in Fig. 1.2.

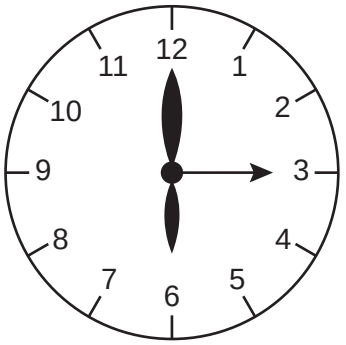

Fig. 1.2

(a) Calculate the time interval between the 1st strike and the 6th strike.

time interval = …….. s [1]

(b) Calculate the time interval between one strike and the next.

time interval = ……s [2]

(c) At precisely 11 o'clock, the clock starts to strike.
Calculate the time interval between the 1st strike and the 11th strike.

time interval = ……s [2]

2 Fig. 2.1 shows a hinged rail in a fence. The rail has to be lifted vertically in order to let people through.

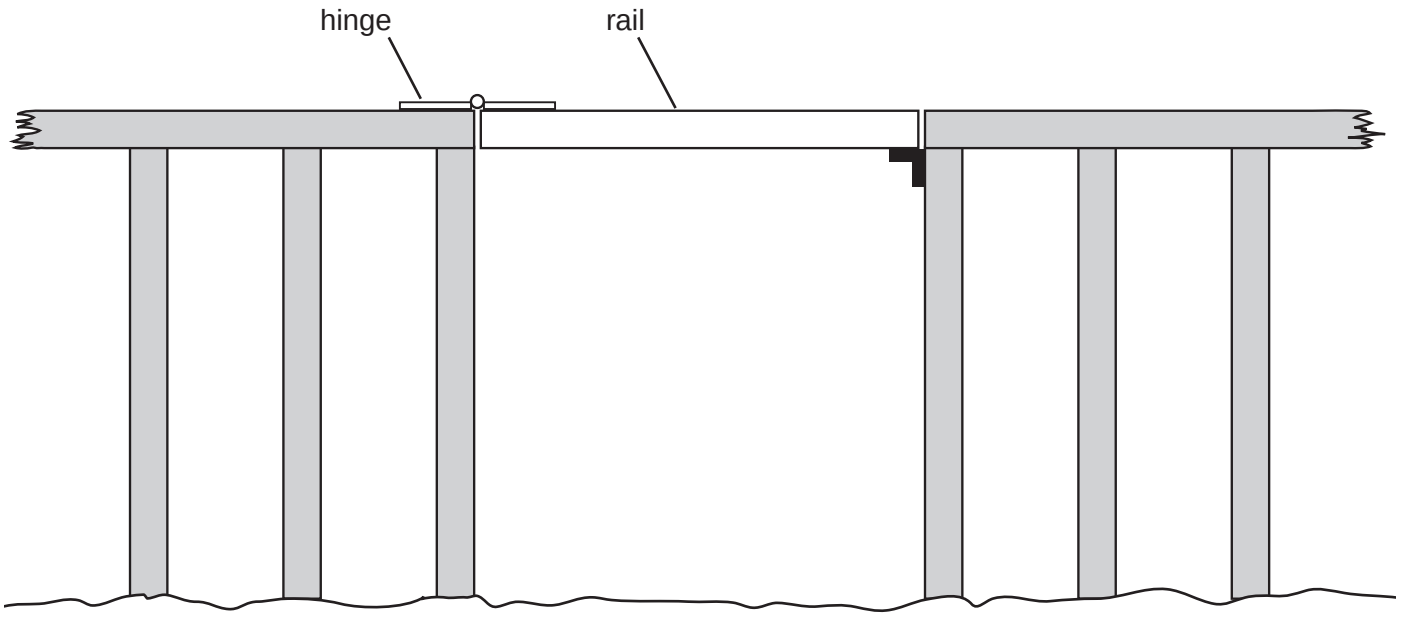

Fig. 2.1

(a) On Fig. 2.1, draw an arrow to show the position and direction of the smallest force that would be needed to begin to raise the rail. [3]

(b) What is the correct Physics term for the turning effect of a force?

Tick one box.

force	☐
work	☐
moment	☐
movement	☐

[1]

(c) Suggest one way the designer of the fence could have reduced the force needed to lift the rail.

.....

.....[1]

[Turn over

3 Fig. 3.1 shows the speed-time graph of part of a short journey made by a cyclist.

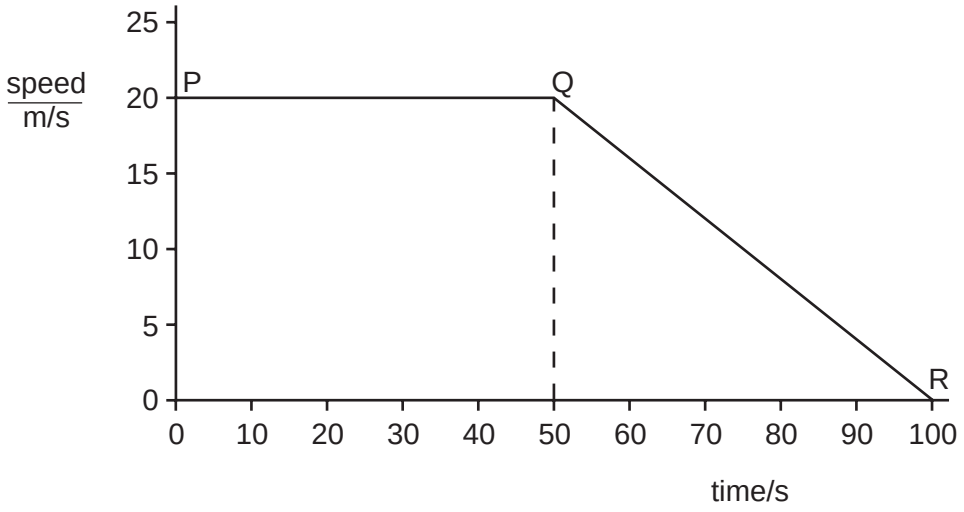

Fig. 3.1

(a) Which part of Fig. 3.1 shows when the cyclist is travelling at constant speed?

.....[1]

(b) State what is happening during the rest of the journey shown in Fig. 3.1.

.....[1]

(c) **(i)** Calculate the distance travelled during the first 50 s.

distance travelled = …….. m

(ii) Calculate the distance travelled between 50 s and 100 s.

distance travelled = …….. m

(iii) Calculate the total distance travelled.

total distance travelled = …….. m

(iv) Calculate the average speed during the 100 s.

average speed = …….. m/s
[8]

[Turn over

4 **(a)** Fig. 4.1 shows a person pulling a loaded barrow along a path from A to B at a steady speed.

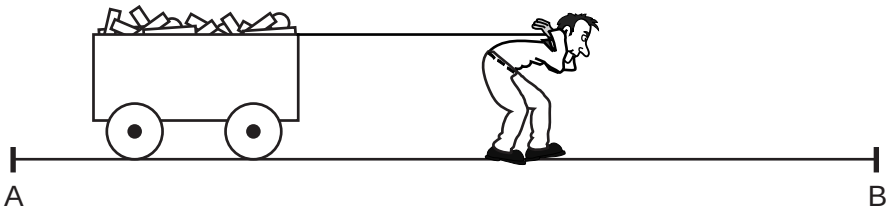

Fig. 4.1

State the two quantities you need to know in order to be able to calculate the work done by the person.

1. .....

2. .....[2]

(b) Another person pulls an identical barrow and load from A to B, but this person pulls much harder than the person in **(a)**.

Describe what happens to the second person's barrow.

.....

.....[2]

(c) **(i)** State which person has the greater power between A and B.

.....

(ii) Give two reasons for your answer to **(c)(i)**.

reason 1 .....

reason 2 .....

[3]

5 Fig. 5.1 shows a shallow dish containing a liquid that evaporates easily. The bulb of a thermometer is held in the liquid. A jet of air is blown over the surface of the liquid, so that the liquid evaporates rapidly.

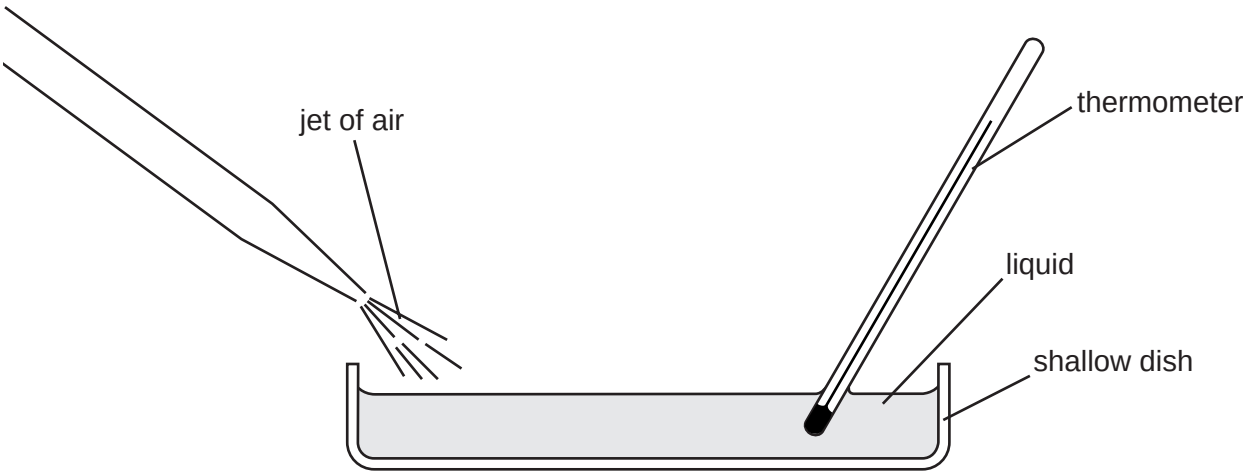

Fig. 5.1

(a) State what happens to the reading shown on the thermometer.

.....[1]

(b) Explain your answer to **(a)** in terms of the behaviour of the molecules of the liquid.

.....

.....

.....[2]

(c) State one example in everyday life where the effect demonstrated by this experiment occurs.

.....[1]

[Turn over

6 **(a)** When a certain amount of heat is supplied to 1 kg of insulated aluminium, the temperature of the aluminium rises by 1 °C.

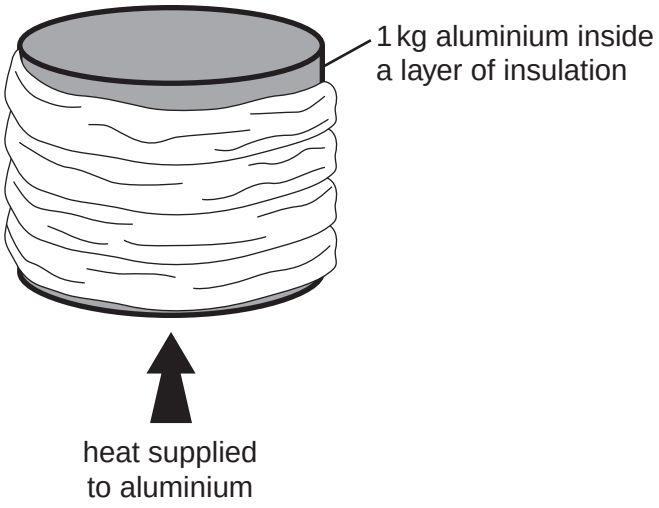

Fig. 6.1

In what form does the aluminium store the energy that has been supplied?

.....[1]

(b) The same amount of heat is supplied to 1 kg of insulated copper, as shown in Fig. 6.2.

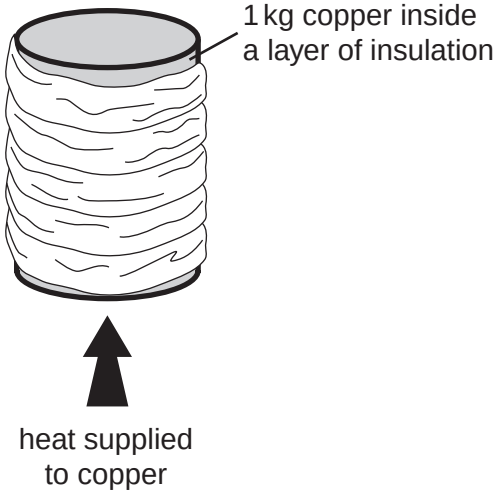

Fig. 6.2

The temperature rise of the 1 kg copper block is greater than the temperature rise of the 1 kg aluminium block in **(a)**.

Explain, in terms of thermal capacity, why this is so.

.....

.....[2]

7 Boy A throws a large stone into a large still pond, as illustrated in Fig. 7.1.

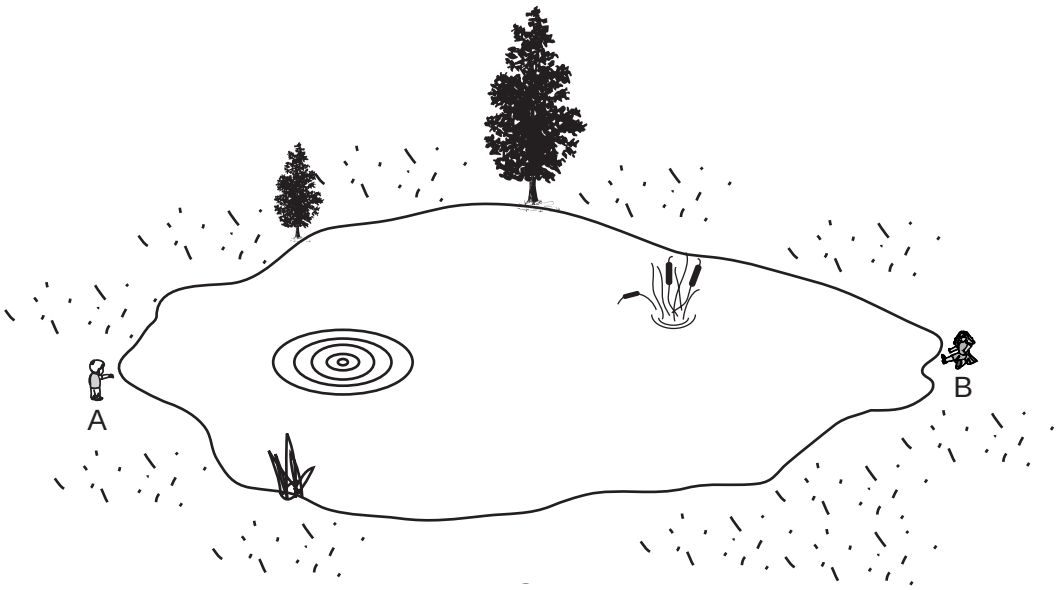

Fig. 7.1

(a) Girl B hears the 'plop' sound of the stone entering the water a very short time after she sees the splash, but it is many seconds before the water wave reaches the edge of the pond where she is sitting.
Use this information to decide which wave travels fastest and which travels slowest.

Write 'fastest' in one box and 'slowest' in another box. Leave one box empty.

sound wave	
light wave	
water wave	

[2]

(b) In the boxes below, state whether each type of wave is a transverse or a longitudinal wave.

sound wave	
light wave	
water wave	

[3]

(c) In the boxes below, put a tick alongside any of the types of wave that do **not** need a substance in which to travel.

sound wave	☐
light wave	☐
water wave	☐

[1]

8 A, B, C and D are an aluminium bar, an unmagnetised iron bar and two bar magnets. Tests are performed to find out which bar is which.
Each row of Fig. 8.1 shows what happens when two of the bars are placed end to end.

A	B	repel
A	C	attract
B	D	no effect

Fig. 8.1

Which bar is which? Complete the lines below.

Bar A is .....

Bar B is .....

Bar C is .....

Bar D is ..... [4]

9 Some pond water becomes contaminated by the release of radioactive waste.
The radioactivity of a sample of the contaminated water is tested every week for 5 weeks.
The results are shown in the table below.

time/weeks	0	1	2	3	4	5
activity / count/s	800	440	240	130	70	40

(a) Plot these values on Fig. 9.1. [3]

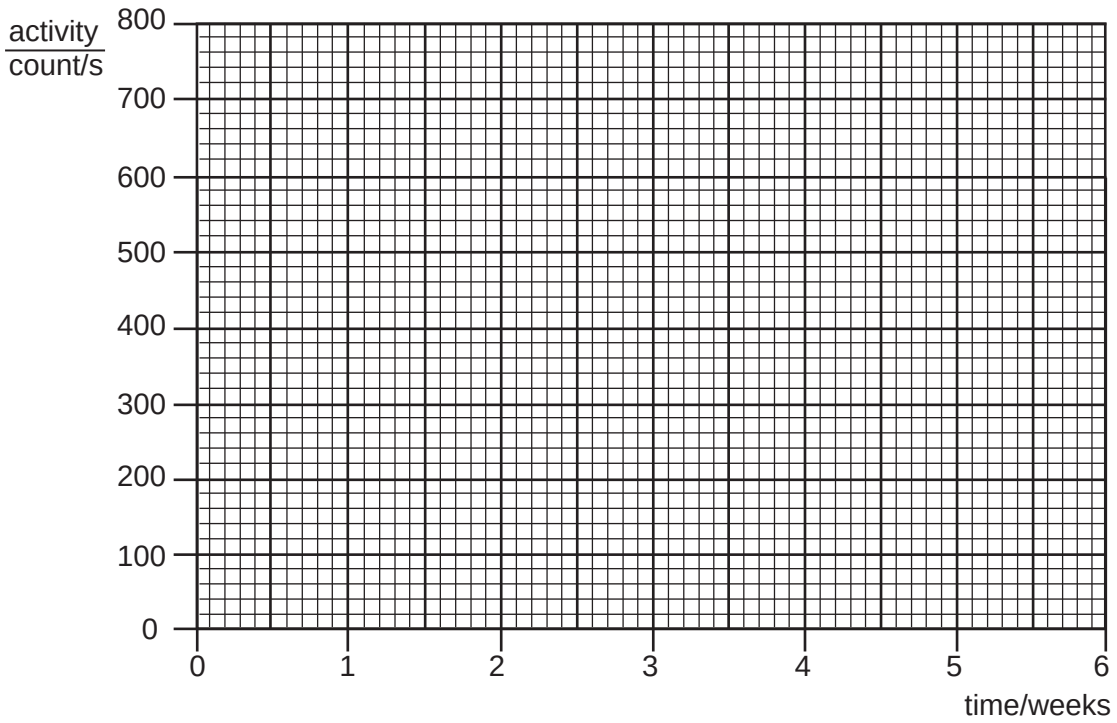

Fig. 9.1

(b) Draw the best curve through your points. [1]

(c) Use your graph to find the half-life of the radioactive material in the sample. Show clearly on the graph how you obtained your answer.

half-life of radioactive material = ……. weeks [2]

(d) If the sample of contaminated water used in the test had been smaller, state how this would have affected, if at all,

(i) the activity readings, ...

(ii) the value of the half-life. .....
[2]

[Turn over

10 (a) One coil of a transformer is connected to a toy train set. The other coil is connected to a 240 V a.c. mains supply, as shown in Fig. 10.1.

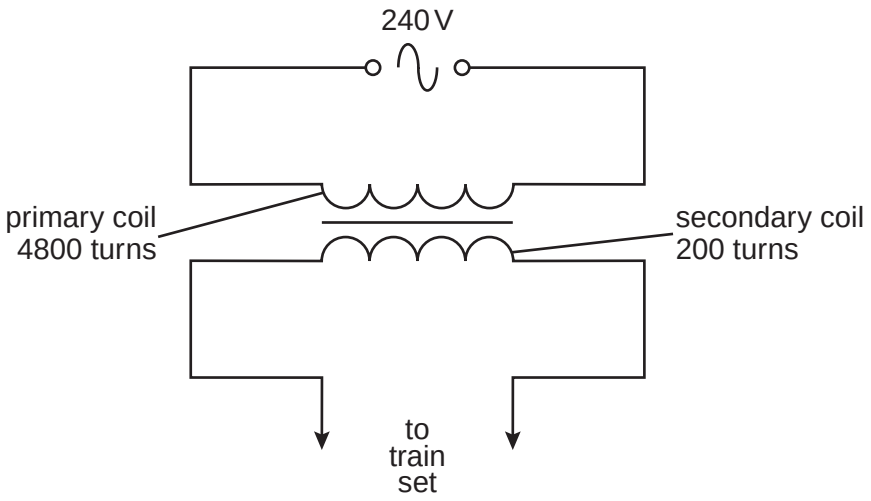

Fig. 10.1

(i) How can you tell from Fig. 10.1 that the transformer is a step-down transformer?

.....

.....[1]

(ii) Calculate the voltage at which the toy train operates.

toy train operates at …… V [3]

(iii) **1.** The voltage of the mains supply is reduced. What happens to the voltage supplied to the train set? Tick one box.

increases	☐
decreases	☐
stays the same	☐

2. An attempt is made to use the train set in a country where the mains supply is 110 V. Suggest **one** difference that might be noticed in the way the toy train operates.

.....

.....

[2]

(b) Fig. 10.2 shows an electromagnetic relay being used to operate an electric motor.

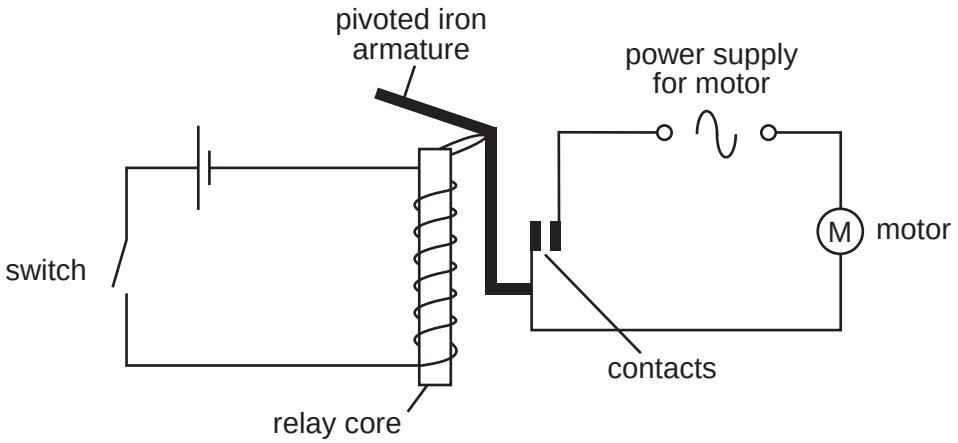

Fig. 10.2

Below are sentences that describe stages of the process by which the circuit works.

A The armature pivots and the contacts close.

B The core of the relay is magnetised.

C The switch is closed and the current flows through the coil.

D A current flows through the motor, making it work.

E The core attracts the top part of the armature.

Put the sentences so that the stages are in the correct order. Put the appropriate letters in the boxes below. One box has been filled in as an example.

Stage 1 is sentence [C]

Stage 2 is sentence [ ]

Stage 3 is sentence [ ]

Stage 4 is sentence [ ]

Stage 5 is sentence [ ] [3]

11 **(a)** The list below contains the names of five different components that might be found in an electric circuit.

capacitor light-dependent resistor resistor thermistor variable resistor

Which of these has

(i) a resistance that falls rapidly when the temperature rises,

.....

(ii) a resistance that changes when a sliding contact is moved,

.....

(iii) a high resistance in the dark but a low resistance in daylight?

.....

[3]

(b) A lamp shines with full brightness when connected to a 12 V battery, as shown in Fig. 11.1.

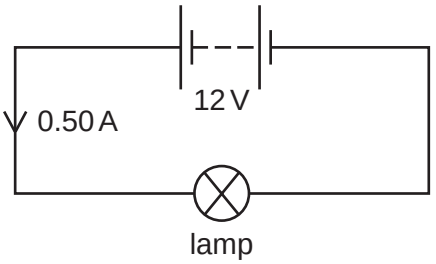

Fig. 11.1

(i) **1.** Write down the equation that links resistance with p.d. and current.

2. The current in the lamp is 0.50 A. Calculate the resistance of the lamp.

resistance of lamp = ……

[4]

(ii) A resistor is now connected in series with the lamp, as shown in Fig. 11.2.

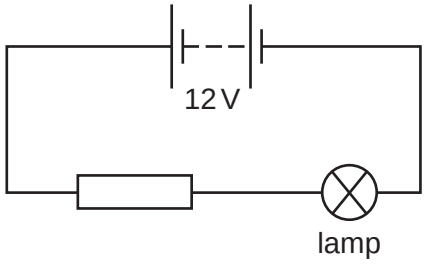

Fig. 11.2

1. State what happens to the current in the lamp when the resistor is added.

.....

2. Explain your answer.

.....

.....

3. Suggest what change might be seen in the lamp.

.....
[3]

12 (a) A man looks at his reflection in a vertical mirror. This is shown from the side in Fig. 12.1.

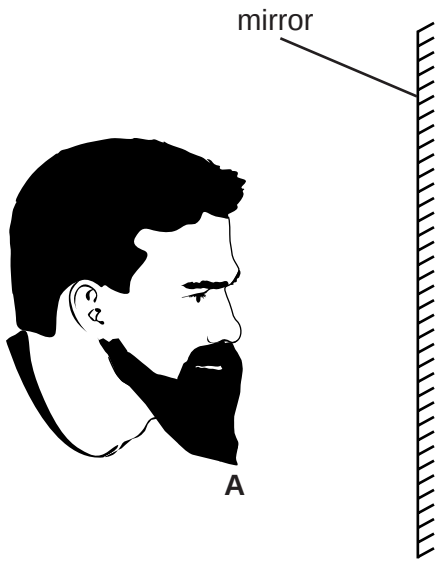

Fig. 12.1

(i) On Fig. 12.1, accurately mark with a **clear dot** labelled **B** where the image of the tip **A** of the man's beard will be.

(ii) On Fig. 12.1, accurately draw a ray from the tip of the man's beard that reflects from the mirror and goes into his eye. You may use faint construction lines if you wish. Use arrows to show the direction of the ray.

(iii) The man can see the image, but it cannot be formed on a screen. What name is given to this type of image?

.....

(iv) Write down the equation that links the angles of incidence and reflection that the ray makes with the mirror.

[7]

(b) A girl looks into a bathroom mirror to brush her hair. Fig. 12.2 shows what she sees in the mirror.

reflection seen in mirror

Fig. 12.2

(i) In which hand is she holding the brush? Tick one box.

left hand ☐

right hand ☐

(ii) She has a spot on her skin just below her left eye.
Mark clearly on Fig. 12.2 where this will appear on the reflection.

[2]

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