Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

7183265192

PHYSICS **0625/32**

Paper 3 Theory (Core) **February/March 2018**

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 in the spaces at the top of the page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.
Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m/s^2).

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.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **20** printed pages.

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CAMBRIDGE International Examinations

[Turn over

1 A student has a pile of A4 paper for his computer printer.

Fig. 1.1 shows the dimensions of the pile of paper.

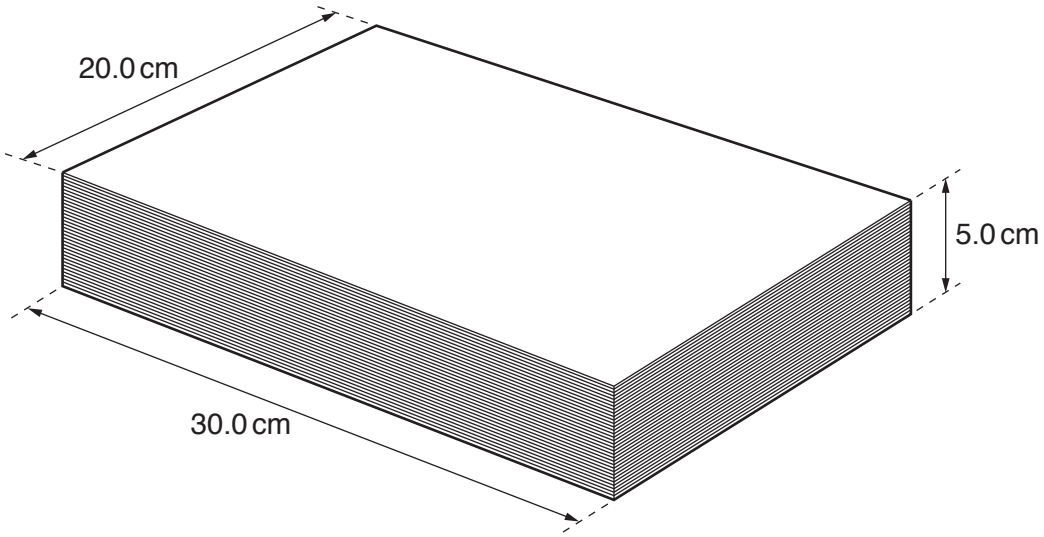


Fig. 1.1 (not to scale)

(a) The pile contains 500 sheets of paper.

Calculate the average thickness of one sheet of paper.

average thickness = ... cm [1]

(b) Show that the pile of paper has a volume of 3000 cm^3. Use the information shown in Fig. 1.1.

[1]

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(c) The student measures the total mass of the paper in the pile.

State the name of a device used to measure mass.

..... [1]

(d) The mass of the paper in the pile is 2400 g.

Calculate the density of the paper.

density = ... g/cm^3 [3]

[Total: 6]

2 Some cyclists are racing around a track.

(a) Fig. 2.1 shows the speed-time graph for one cyclist.

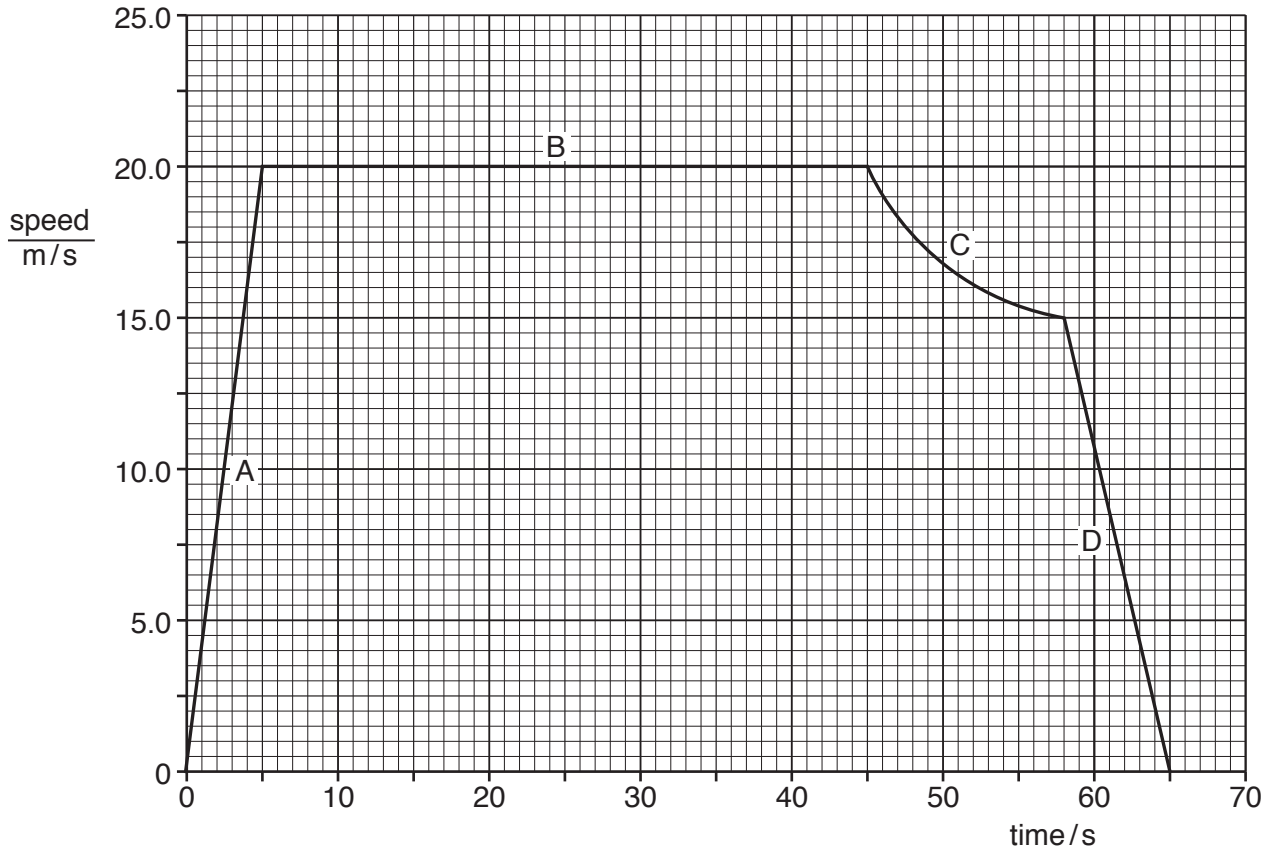


Fig. 2.1

(i) Tick the box that represents the cyclist travelling at constant speed.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

[1]

(ii) Calculate the distance travelled by the cyclist in the first 5 seconds.

distance = ... m [3]

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(b) The length of the track is 250 m.

Another cyclist goes around the track four times (four laps). This takes 80.0 seconds.

(i) Calculate the average speed of this cyclist.

average speed = ... m/s [4]

(ii) A friend of the cyclist starts a stopwatch at the beginning of the race.

Fig. 2.2 shows the reading on the stopwatch when the cyclist has gone around the track **once**.

Fig. 2.3 shows the reading on the stopwatch when the cyclist has gone around the track **twice**.



Fig. 2.2



Fig. 2.3

Calculate the time taken for the cyclist to go around the track during the second lap.

time = ... s [1]

[Total: 9]

3 Fig. 3.1 shows the load-extension graphs for two springs, A and B.

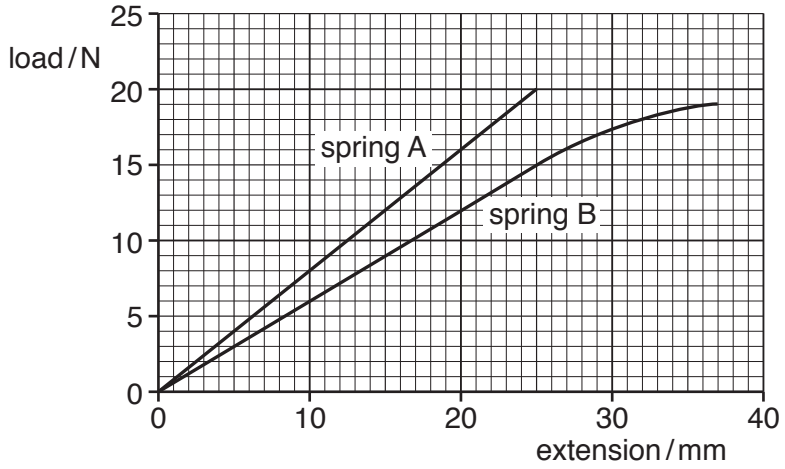


Fig. 3.1

(a) Determine the extension of spring A for a load of 10 N.

extension = ... mm [1]

(b) State which spring is easier to stretch and give a reason for your answer.

spring .....

reason .....

.....
[2]

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(c) A different spring is suspended from the edge of a bench, as shown in Fig. 3.2.

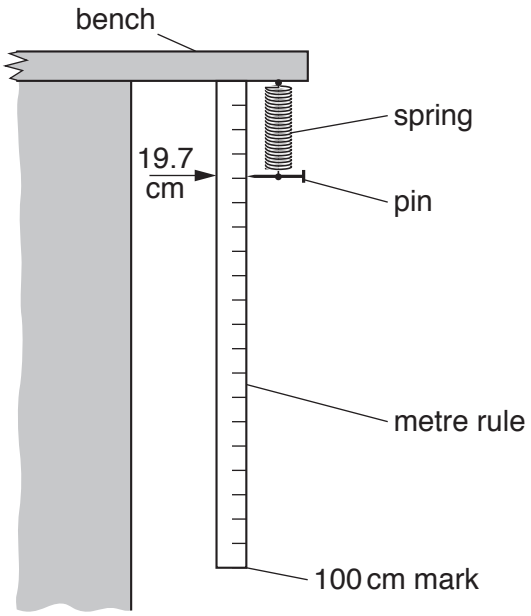


Fig. 3.2

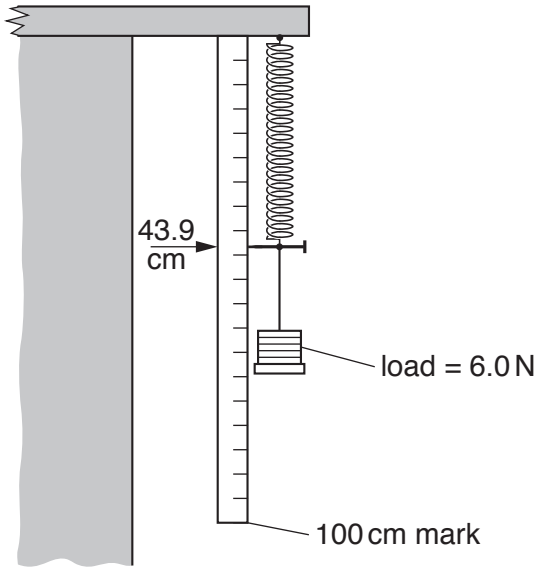


Fig. 3.3

With no load on the spring, the pin points to 19.7 cm on the metre rule, as shown in Fig. 3.2. When a load of 6.0 N is attached to the spring, the pin points to 43.9 cm, as shown in Fig. 3.3.

(i) Calculate the extension of this spring for a load of 6.0 N.

extension = ... cm [1]

(ii) Describe how a student could use the equipment in Fig. 3.2 to obtain accurate readings for a load-extension graph for this spring.

.....

.....

.....

.....

..... [2]

[Total: 6]

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4 Fig. 4.1 represents a hydroelectric system for generating electrical energy.

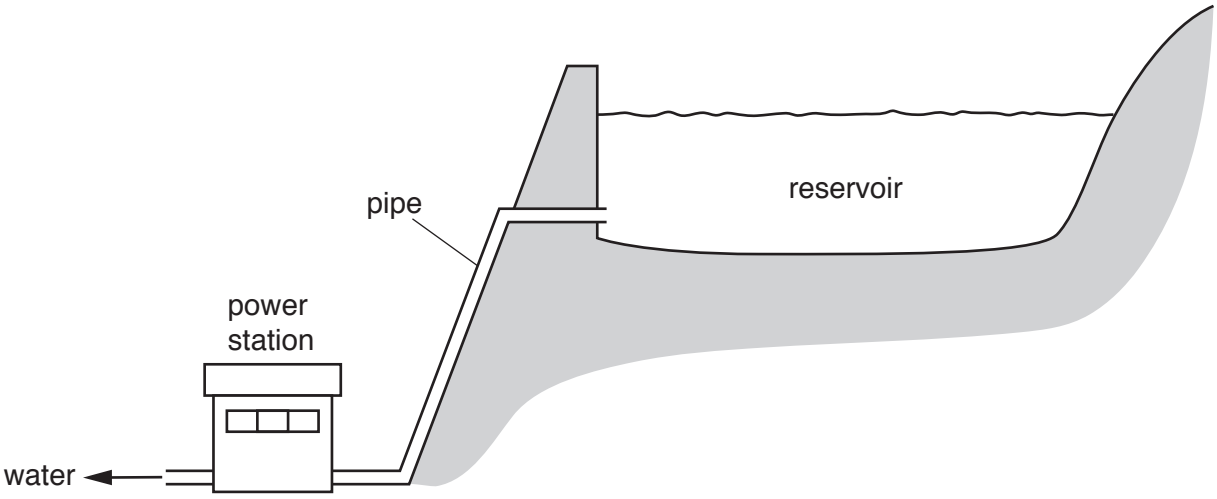


Fig. 4.1

(a) Describe how the power station uses the water in the reservoir to generate electrical energy.

.....

.....

.....

.....

.....

..... [3]

(b) State **three** advantages of generating electrical energy using a hydroelectric system compared with using a coal-fired power station.

1. .....

.....

2. .....

.....

3. .....

.....

[3]

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(c) An electric drill is shown in Fig. 4.2. It uses electrical energy.



Fig. 4.2

Complete the sentences about the electric drill.

Use words from the box. Each word may be used once, more than once, or not at all.

efficient	kinetic	potential	powerful	reliable	thermal

(i) The electric drill **usefully** transforms electrical energy into ..... energy. [1]

(ii) A second electric drill transforms the same amount of electrical energy per second as the first one. It wastes more of this energy.

The second drill is **less** ..... than the first drill. [1]

[Total: 8]

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5 Fig. 5.1 shows a glass bottle containing air. The bottle is sealed with a cap.

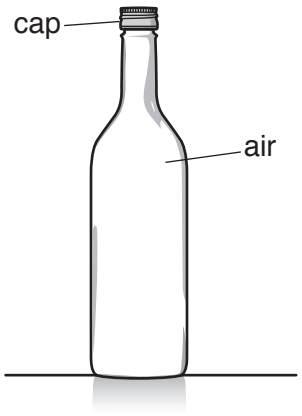


Fig. 5.1

(a) The air in the bottle becomes warmer.

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

..... [1]

(ii) Explain why the pressure of the air in the bottle changes. Use your ideas about gas molecules.

.....

.....

.....

.....

.....

..... [4]

(b) The bottle has a weight of 5.4 N and an area of 9.2 cm^2 in contact with the table.

Calculate the pressure produced by the bottle on the table. Give the unit.

pressure = ... [3]

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(c) Fig. 5.2 shows another bottle. The bottle is on a table. Part of the base of this bottle is **not** in contact with the table.

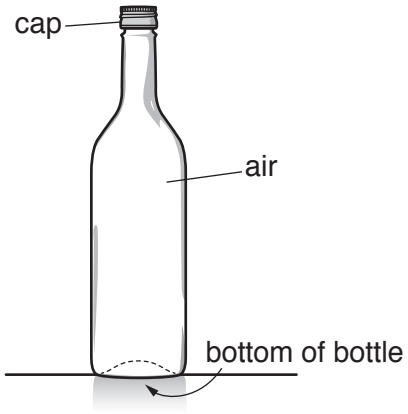


Fig. 5.2

Fig. 5.3 shows the base of the bottle. The shaded area is **not** in contact with the table.

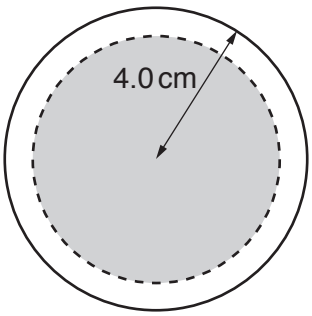


Fig. 5.3 (not to scale)

(i) The base of the bottle is circular. The radius of the outer circle is 4.0 cm as shown in Fig. 5.3. Calculate the area of this circle.

area = ... cm^2 [1]

(ii) The bottle shown in Fig. 5.2 has the same mass as the bottle shown in Fig. 5.1. Explain why the bottle shown in Fig. 5.2 exerts more pressure on the table than the bottle shown in Fig. 5.1.

.....

..... [1]

[Total: 10]

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6 A thermometer is used to measure the temperature inside a room in a house.

(a) State a physical property that varies with temperature and can be used in a thermometer.

..... [1]

(b) Fig. 6.1 shows how the temperature of the room changes between 6:00 pm and 11:00 pm.

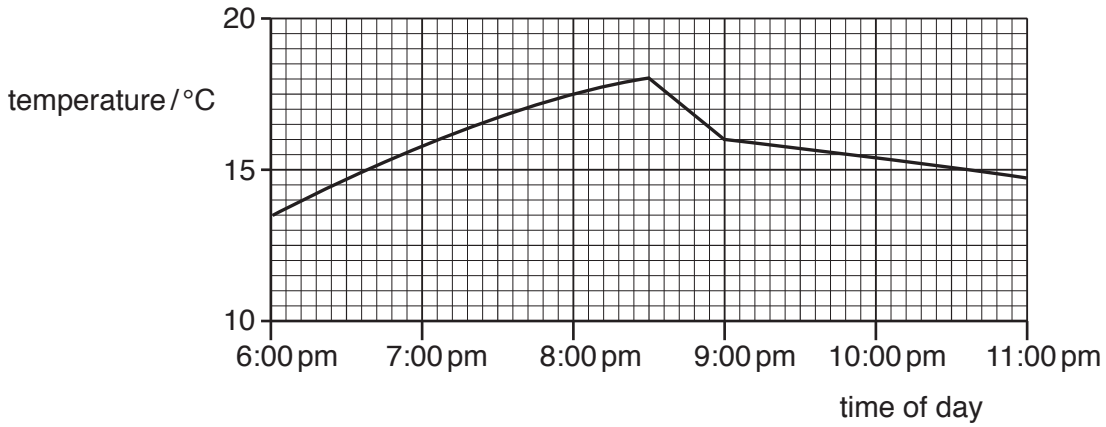


Fig. 6.1

A heater in the room is switched on at 6 pm. The room has a large window. A large amount of thermal energy is transferred through the window. The window in the room has thick curtains. Closing the curtains reduces the loss of thermal energy from the room.

(i) Suggest the time at which the heater is switched off.

..... [1]

(ii) Suggest the time at which the curtains were closed and explain your answer. Use information from the graph.

time .....

explanation .....

.....
[2]

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(c) In cool climates, people use mineral wool to reduce heat loss from houses. Mineral wool is made of fibres and trapped air, as shown in Fig. 6.2.

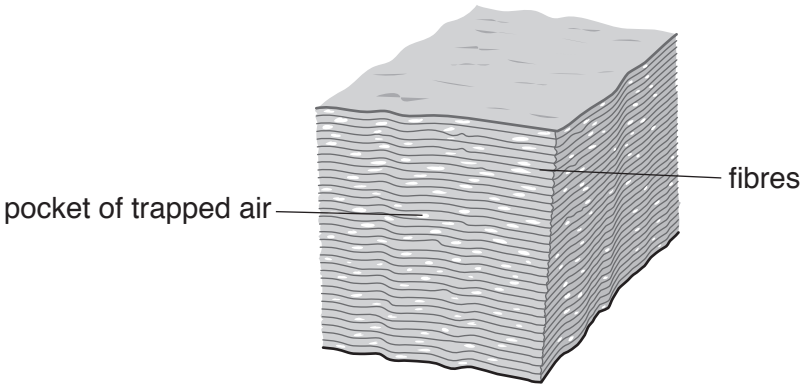


Fig. 6.2

Use words from the box to complete the sentences. Each word may be used once, more than once, or not at all.

conductor	conduction	convection	emitter	insulator	radiation	radiator

Air is a good ..... .

When air is trapped between fibres, it reduces heat loss by ..... and by

..... .

[3]

[Total: 7]

7 **(a)** A ray of light refracts as it travels from air into glass, as shown in Fig. 7.1.

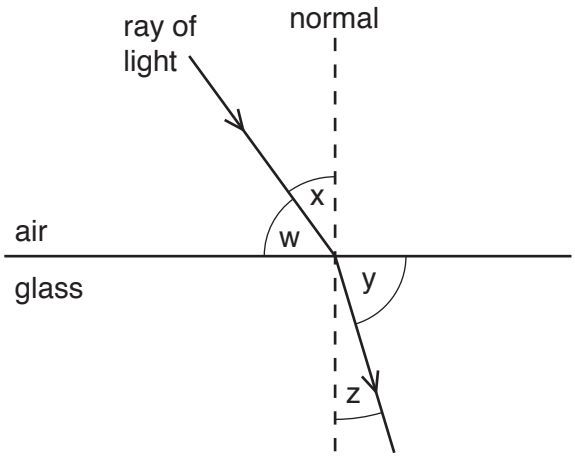


Fig. 7.1

(i) State which angle w, x, y or z, is the angle of refraction.

..... [1]

(ii) Light is a transverse wave.
State another example of a transverse wave.

..... [1]

(b) Fig. 7.2 represents some wavefronts approaching a barrier with a narrow gap.

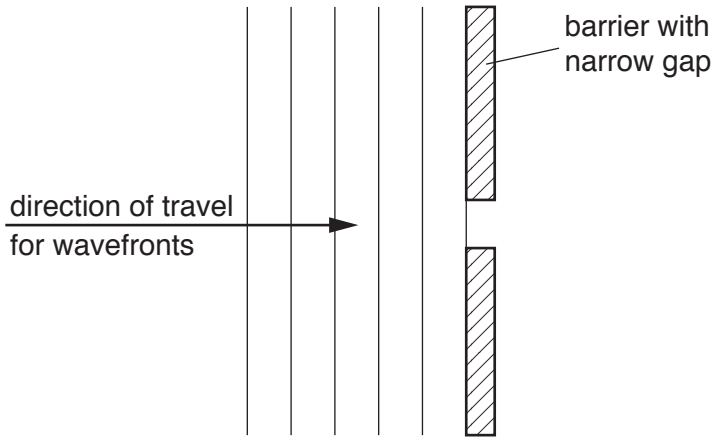


Fig. 7.2

(i) On Fig. 7.2, draw three wavefronts that have passed through the gap. [2]

(ii) State the name of the effect in **(b)(i)**.

..... [1]

[Total: 5]

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8 A student sets up an electrical circuit. She draws part of the circuit diagram, as shown in Fig. 8.1.

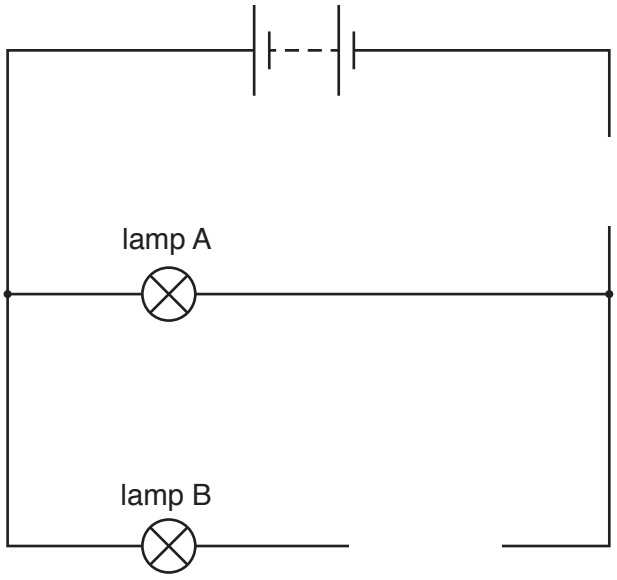


Fig. 8.1

(a) On Fig. 8.1, draw the circuit symbols for three devices so that the student can:

(i) measure the total current in the circuit [1]

(ii) vary the current in the lamp B only [1]

(iii) measure the potential difference (p.d.) across lamp B. [2]

(b) The current in lamp A is 0.20 A. The potential difference (p.d.) across lamp A is 6.0 V.

Calculate the resistance of lamp A.

resistance = ... Ω [3]

[Total: 7]

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9 **(a)** Fig. 9.1 represents the seven main regions of the electromagnetic spectrum.

radio waves	microwaves	infra-red radiation	visible light	ultraviolet		gamma rays

Fig. 9.1

(i) In Fig. 9.1, one region is not named.
State the name of the radiation in this region.

..... [1]

(ii) State which region has waves with the longest wavelength.

..... [1]

(b) Tick the box for the wave with the lowest speed in air.

- ☐ ultraviolet
- ☐ ultrasound
- ☐ visible light [1]

(c) A group of students want to determine the speed of sound in air.

Describe a method they can use. State the measurements they need to make.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 7]

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10 (a) A teacher demonstrates electromagnetic induction using the apparatus shown in Fig. 10.1.

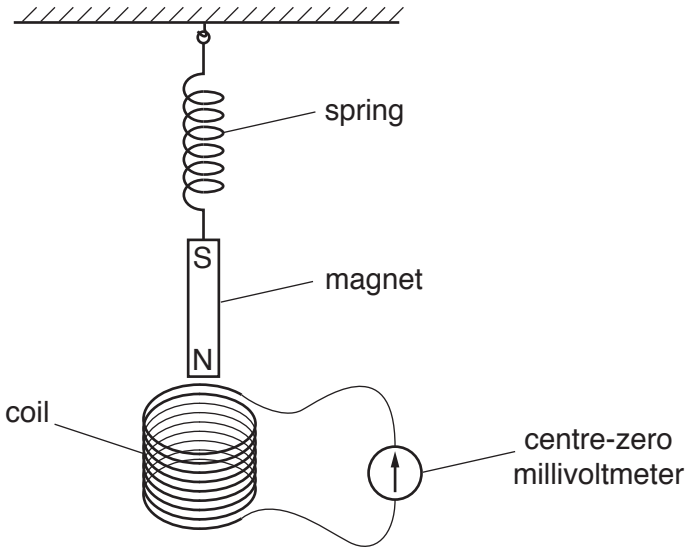


Fig. 10.1

The teacher pulls the magnet down until one end is inside the coil. The teacher then releases the magnet. The magnet moves up and down repeatedly. As it moves, one end of the magnet enters and leaves the coil.

Describe and explain the readings on the centre-zero millivoltmeter as the magnet enters and leaves the coil.

.....

.....

.....

.....

..... [4]

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(b) Fig. 10.2 shows a system for transmitting electricity from a power station.

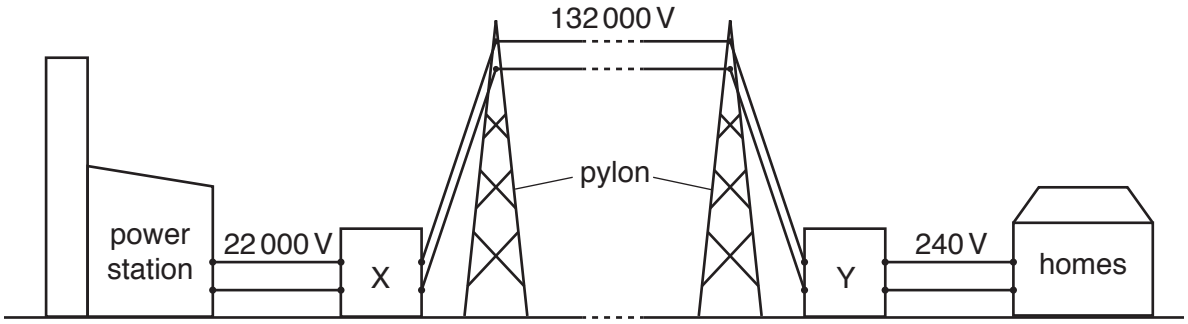


Fig. 10.2

State the name of the device used in X and the name of the device used in Y.

X .....

Y .....

[2]

[Total: 6]

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11 **(a)** A student rubs a polythene rod with a dry cloth. The polythene rod becomes negatively charged.

Describe and explain how the rod becomes negatively charged.

.....

.....

..... [3]

(b) The negatively charged polythene rod hangs from a nylon thread so that it is free to turn.

The student charges a second polythene rod and brings it close to the first rod, as shown in Fig. 11.1.

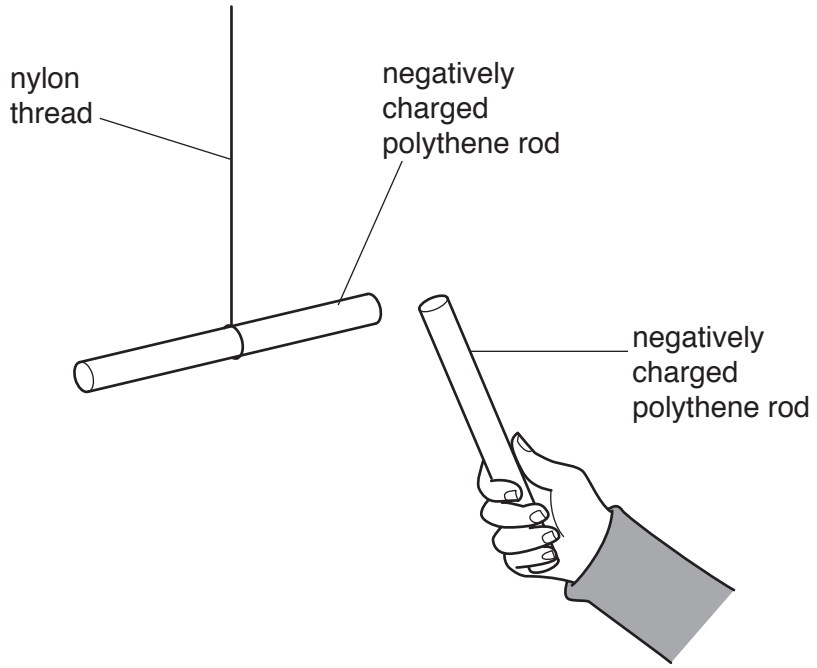


Fig. 11.1

Describe and explain what happens when the negatively charged rods are close to each other.

.....

..... [2]

[Total: 5]

12 Fig. 12.1 shows a radioactive source placed close to a radiation detector and counter. The detector can detect α, β and γ radiation.

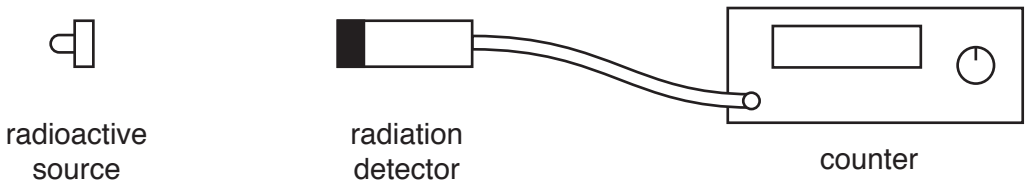


Fig. 12.1

The radioactive source emits β-particles only.

Describe how you could show that the source emits β-particles only.
As part of your answer, you may draw on Fig. 12.1 and add any other apparatus you may need.

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 4]

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