Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2580177094

PHYSICS **0625/32**

Paper 3 Theory (Core) **February/March 2016**

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.
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.

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

This document consists of **23** printed pages and **1** blank page.

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1 A student is investigating volume and density.

The student has a box, as shown in Fig. 1.1, a balance, a rule and some dry sand.

(a) Fig. 1.1 shows the dimensions of the inside of the box.

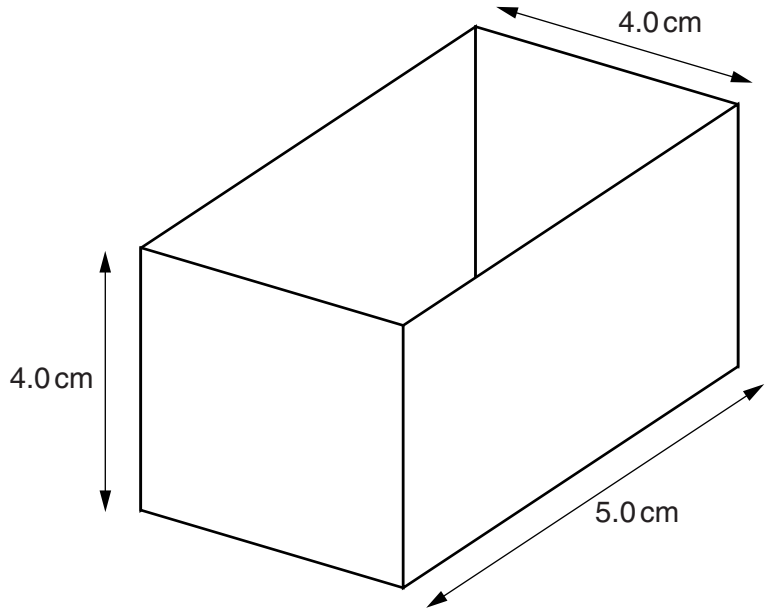


Fig. 1.1 (not to scale)

Calculate the volume of sand needed to fill the box.

volume of sand = ... cm^3 [1]

(b) The student measures the mass of the box when empty and when filled with sand.

quantity	mass / g
mass of box filled with sand	216.0
mass of empty box	40.0

Calculate the mass of the sand in the box, using her results.

mass of sand = ... g [1]

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(c) Calculate the density of the sand.

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

(d) A miner has a bag containing a mixture of gold dust and sand. Gold has a density of $19.3\,g/cm^3$.

He heats the mixture until the gold melts.

Predict whether the sand will float on top of the molten gold. Explain your answer.

.....

.....

.....[2]

[Total: 7]

2 Three students walk together from school to a bridge. The students stand together on the bridge for three minutes and then return separately to school.

The distance-time graphs for student A, student B and student C are shown in Fig. 2.1.

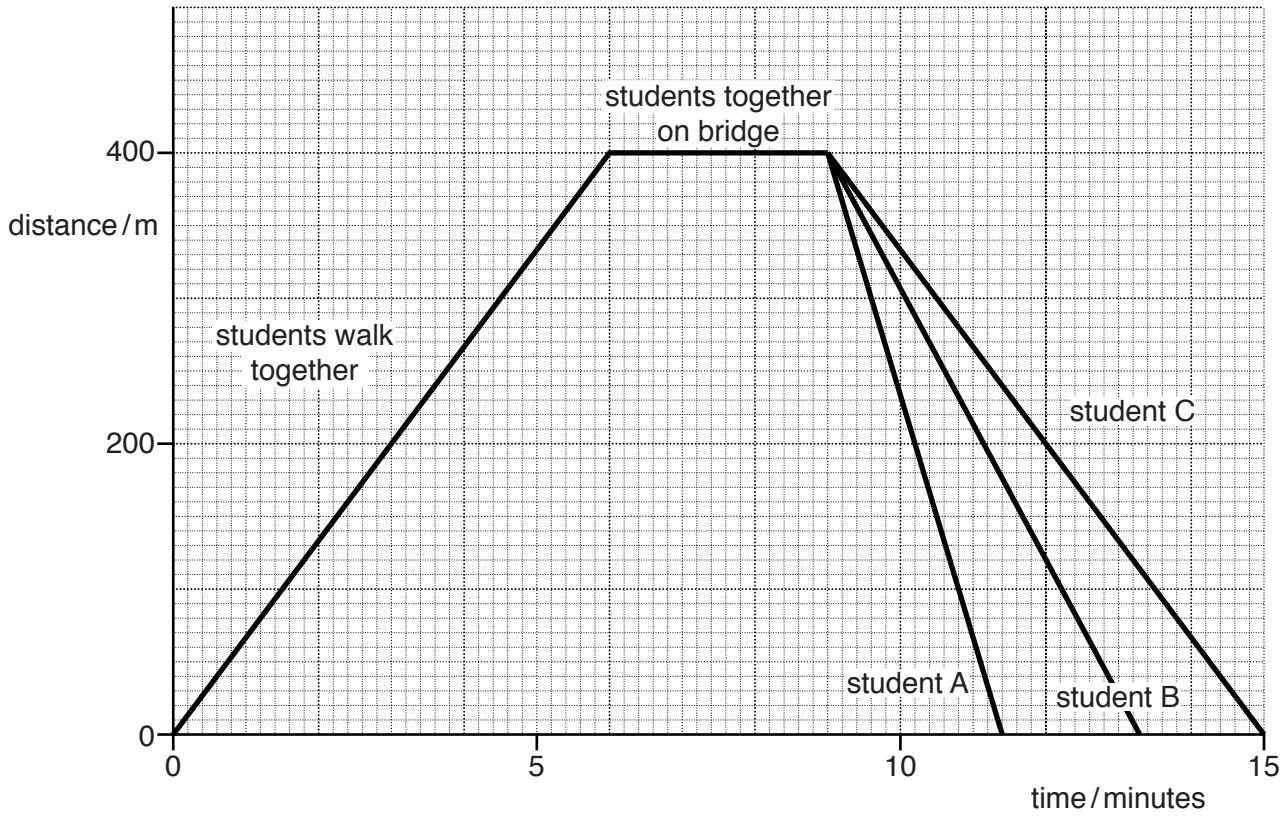


Fig. 2.1

(a) (i) Determine the distance from the school to the bridge.

distance = ... m [1]

(ii) Calculate the average speed of the students when they are walking to the bridge. Give your answer in m / s.

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

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(b) The students return to school at different speeds. One student walks slowly, one student walks quickly and the other student runs.

State which student runs. Explain how this is shown by the graph.

student .....

explanation .....

.....[2]

[Total: 7]

3 Fig. 3.1 shows a see-saw. The see-saw is horizontal when not in use.

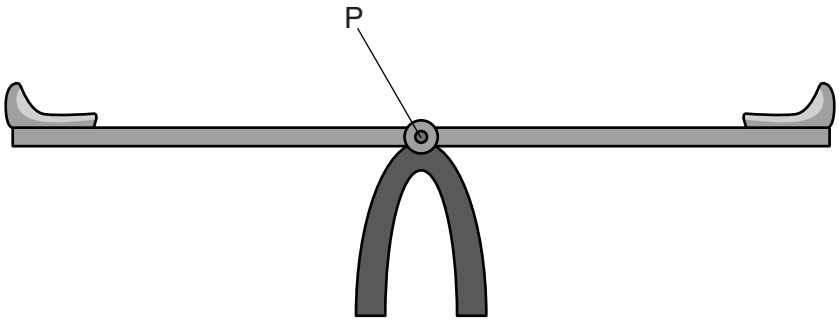


Fig. 3.1

A small child sits on one seat of the see-saw. This creates a turning effect about point P.

(a) Which of these words means the turning effect of a force? Tick one box.

- ☐ equilibrium
- ☐ moment
- ☐ resultant

[1]

(b) State the scientific name for point P.

.....[1]

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(c) A much heavier boy sits on the other end of the see-saw, as shown in Fig. 3.2.

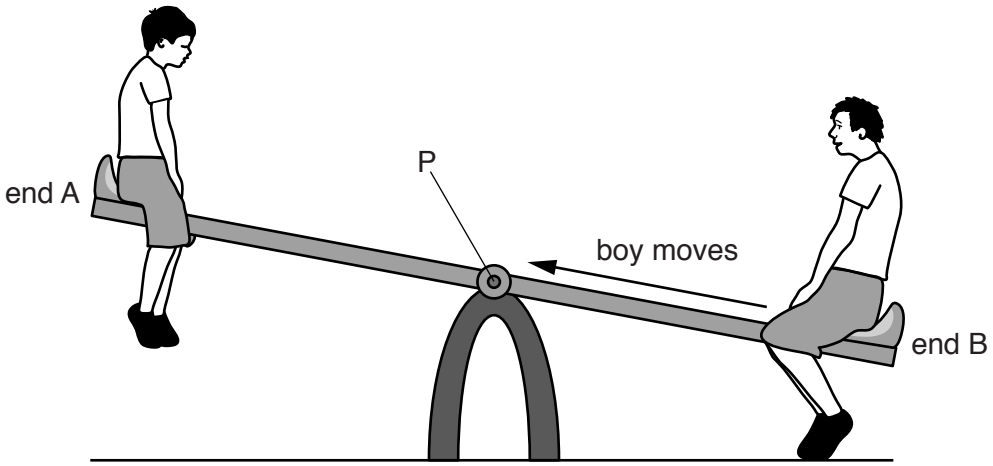


Fig. 3.2

The heavier boy moves slowly along the see-saw from end B until he reaches point P.

Describe and explain what happens to the see-saw.

.....

.....

.....

.....

.....[4]

[Total: 6]

4 Fig. 4.1 shows a balloon near a window on a warm sunny day.

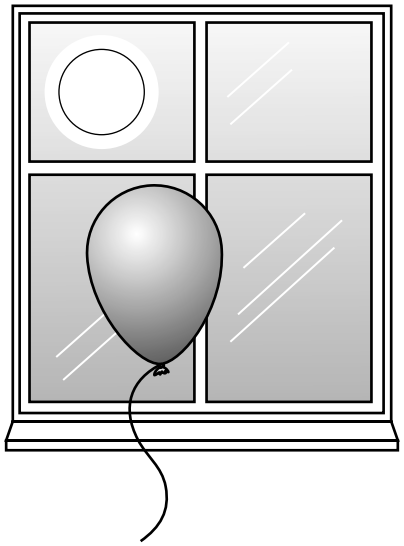


Fig. 4.1

Fig. 4.2 shows how the volume of the balloon changes throughout the day.

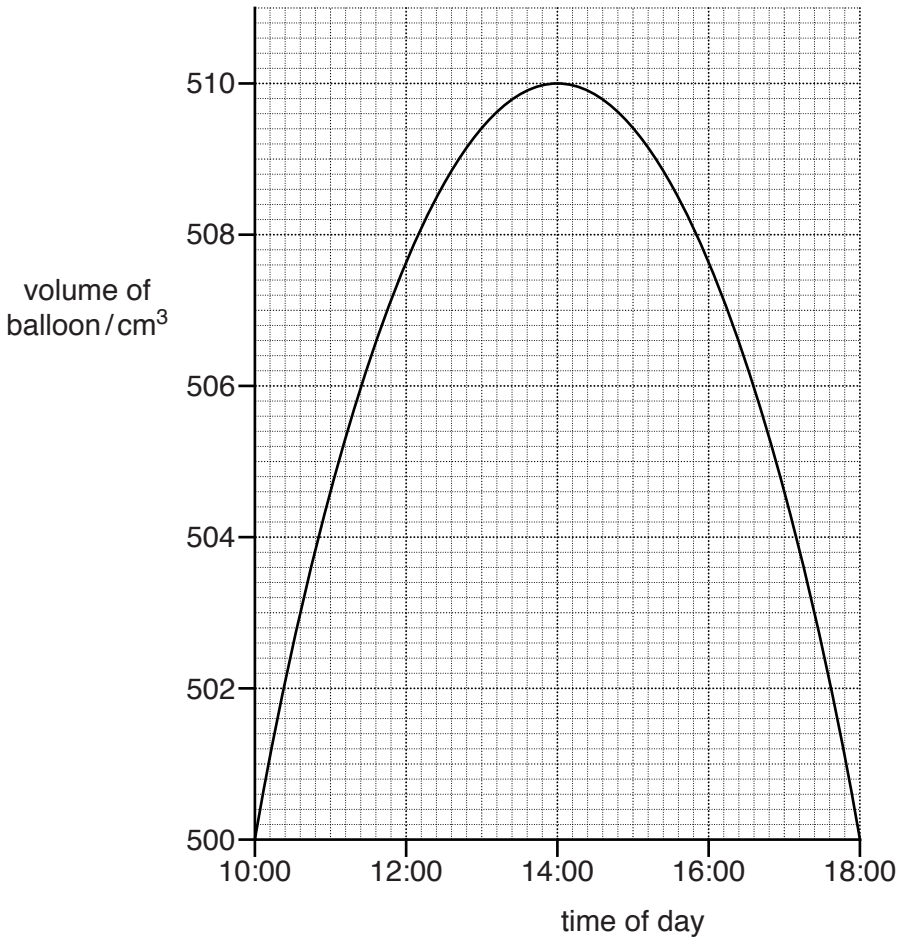


Fig. 4.2

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(a) Describe how the volume changes throughout the day.

.....[1]

(b) Explain, in terms of the gas molecules inside the balloon, why the volume changes in this way between 10:00 and 14:00.

.....

.....

.....

.....

.....

.....[3]

[Total: 4]

5 Fig. 5.1 shows a wave-powered generator. It generates electricity from the movement of sea waves.

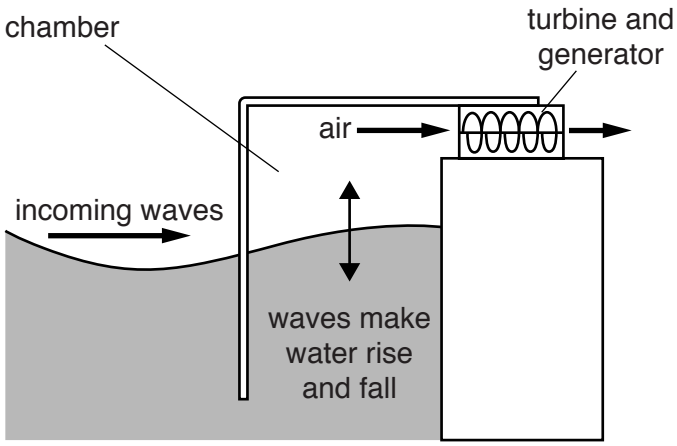
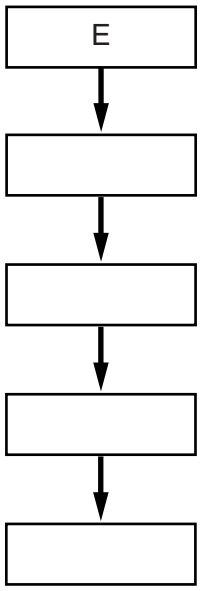


Fig. 5.1

(a) The sentences below describe how the wave-powered generator works.

A Air is pushed through the turbine, making it spin.
B Water rises and falls in the chamber.
C The turbine turns a generator.
D The generator produces electrical energy.
E Waves travel towards the chamber.

Write letters in the boxes below to arrange the sentences in the correct order. The first one is done for you.



[3]

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(b) More electricity needs to be generated from renewable sources instead of from burning fossil fuels.

State **three** benefits of generating electricity from renewable sources rather than from fossil fuels.

.....

.....

.....

.....

.....[3]

[Total: 6]

6 **(a)** Fig. 6.1 shows a plane mirror reflecting a ray of light.

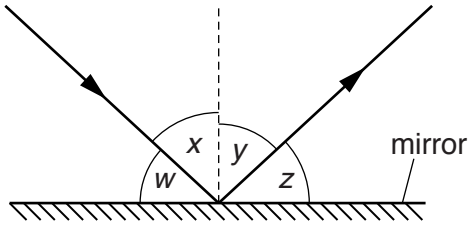


Fig. 6.1

(i) There is a dashed line drawn at right angles to the mirror.

State the name of this line.

.....[1]

(ii) State which angle, *w*, *x*, *y*, or *z*, is the angle of reflection.

.....[1]

(b) Fig. 6.2 shows a ray of white light entering a semi-circular glass block. The ray of light emerges at point R and travels alongside the flat surface.

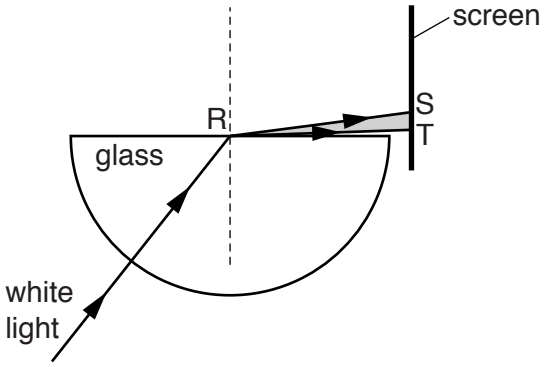


Fig. 6.2

A spectrum of colours can be seen on the screen between S and T.

(i) State the colours in the correct order. One has been done for you.

colour at S ..... red .....

.....

.....

.....

.....

.....

colour at T ..... [1]

(ii) The angle of the ray is changed.

On Fig. 6.3, complete the path of the ray of light. Explain your answer.

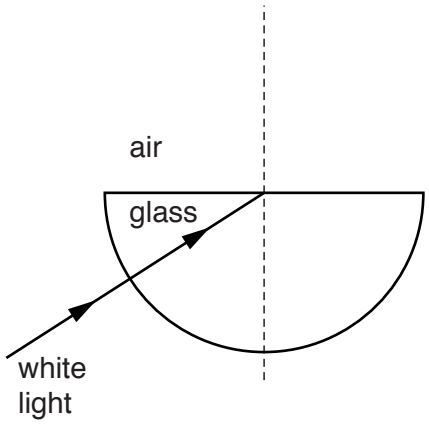


Fig. 6.3

.....

.....

.....[3]

[Total: 6]

7 Fig. 7.1 shows a room with a heater.

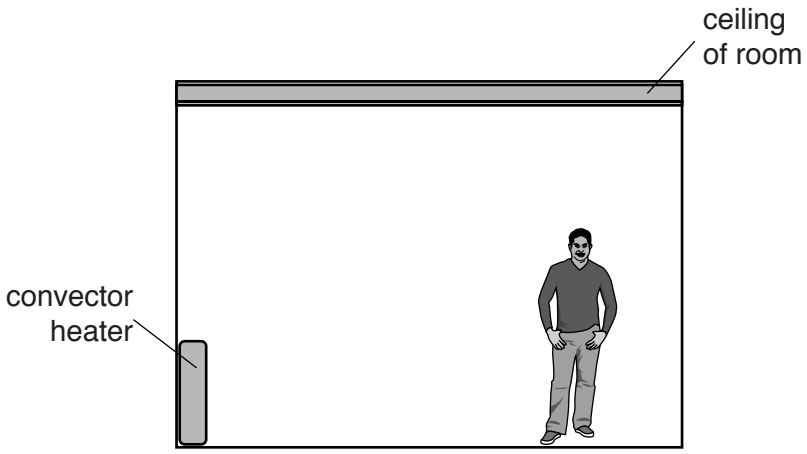


Fig. 7.1

(a) The temperature in the room is hottest near to the ceiling. Explain why.

.....

.....[2]

(b) The ceiling of the room is made from an insulating material as shown in Fig. 7.2.

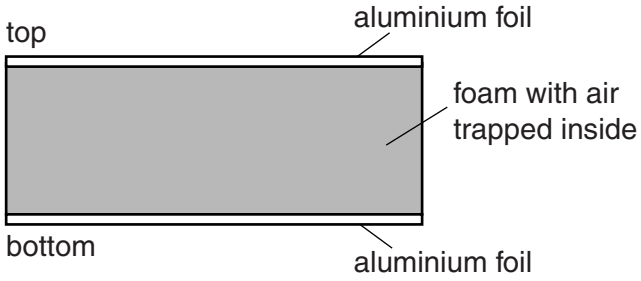


Fig. 7.2

Explain how this reduces the transfer of thermal energy through the ceiling.

.....

.....

.....

.....

.....

.....[4]

[Total: 6]

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8 **(a)** Some students want to determine the speed of sound in air.

Describe a method they could use. Include the measurements they must make.

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.....[4]

(b) The graph in Fig. 8.1 represents a sound wave.

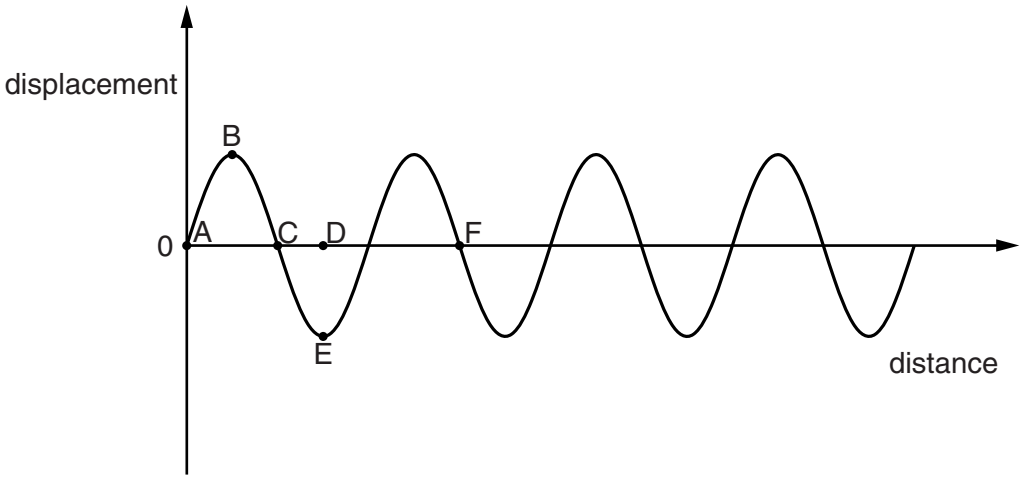


Fig. 8.1

(i) Which distance represents the amplitude of the wave? Circle your answer. [1]

AC AF BE DE CF

(ii) Which distance represents the wavelength of the wave? Circle your answer. [1]

AC AF BE DE CF

(iii) Another sound wave, of the same wavelength, is louder.

On Fig. 8.1, draw this wave. [2]

[Total: 8]

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9 Waves from different regions of the electromagnetic spectrum have different uses.

(a) Draw **one** line from each type of electromagnetic wave to its use.

	household lights
microwaves	television remote control
	loudspeaker
infra-red waves	satellite communications
	security check of suitcases

[2]

(b) Many years ago, some shoe shops used X-ray machines to make images of feet, as shown in Fig. 9.1.

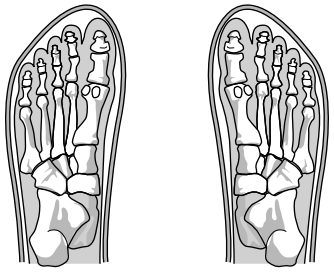


Fig. 9.1

Explain the risk to health of using these X-ray machines.

.....

.....

.....

.....[2]

[Total: 4]

10 A student uses a bar magnet to distinguish between an unlabelled magnet and an iron bar.

(a) Describe how the student identifies which is the magnet and which is the iron bar.

.....

.....

.....

.....[2]

(b) The student suspends the iron bar near to a coil, as shown in Fig. 10.1. The iron bar is free to move.

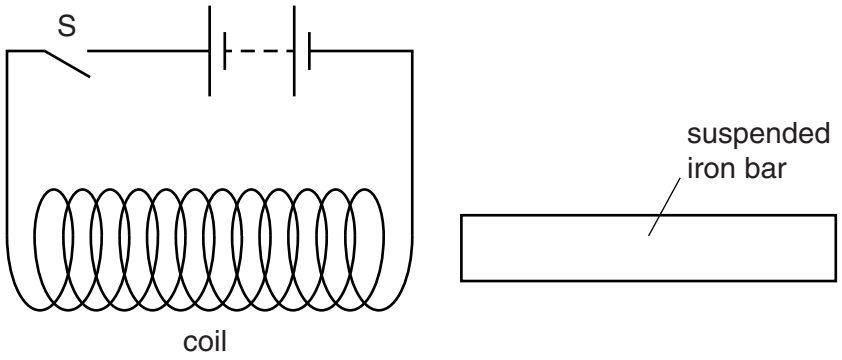


Fig. 10.1

Describe and explain what happens when the switch S is closed.

.....

.....

.....

.....

.....

.....[3]

(c) Fig. 10.2 shows a wire passing through a piece of card.

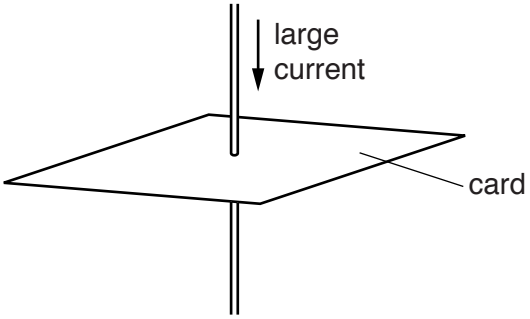


Fig. 10.2

There is a current in the wire in the direction of the arrow.

On Fig. 10.3, draw the pattern of the magnetic field lines due to the current in the wire. Include the direction of the field. [3]

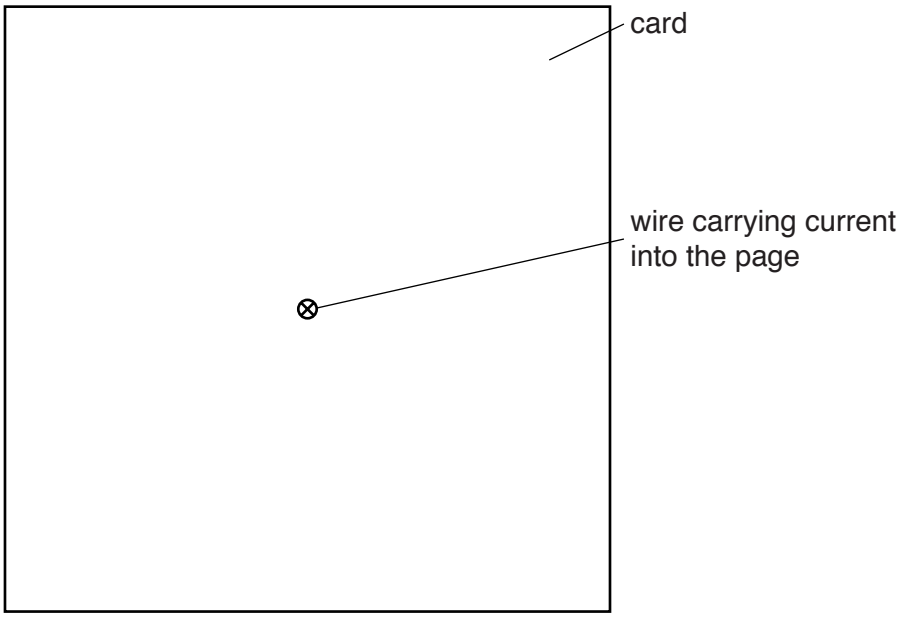


Fig. 10.3

[Total: 8]

11 (a) A student changes the current in a filament lamp. She measures the current and the potential difference (p.d.) across the lamp.

Fig. 11.1 is an incomplete circuit diagram.

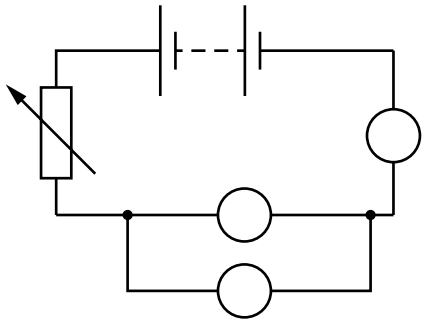


Fig. 11.1

(i) On Fig. 11.1, complete the unfinished circuit symbols. [3]

(ii) One pair of readings for the lamp is shown in the table.

p.d./V	current/A
6.0	1.2

Calculate the resistance of the filament in the lamp for these readings.

resistance of filament = ...Ω [3]

(iii) After many hours of use, the filament wire in a lamp becomes thinner.

State the effect, if any, on the resistance of the lamp.

.....[1]

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(b)(i) Complete the circuit in Fig. 11.2 to show a battery connected to three lamps arranged in parallel.

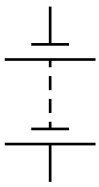


Fig. 11.2

[2]

(ii) Describe **two** advantages of connecting these lamps in parallel with the battery.

.....

.....[2]

[Total: 11]

12 Three types of ionising radiation are alpha, beta and gamma.

(a) Draw **one** straight line from each type of radiation to a property of that radiation.

type of radiation	property of radiation
alpha α	has a negative charge
beta β	has a long half-life
gamma γ	is stopped by paper
	is electromagnetic radiation

[3]

(b) Polonium-210 has the nuclide notation $^{210}_{84}Po$.

For one neutral atom of polonium-210,

(i) determine the number of protons, ...[1]

(ii) determine the number of neutrons. .....[1]

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(c) Fig. 12.1 shows a decay curve for polonium-210.

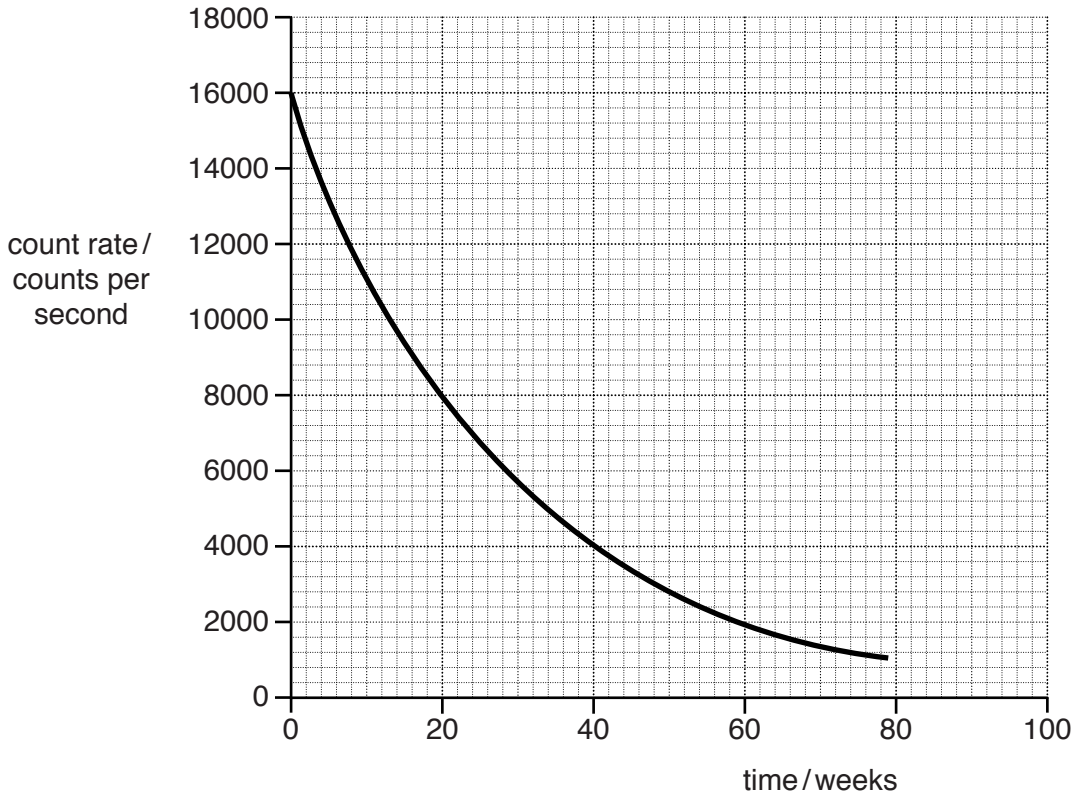


Fig. 12.1

Use the graph to determine the half-life of polonium-210.

half-life = ... weeks [2]

[Total: 7]

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