Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

PHYSICS **0625/32**

Paper 3 Theory (Core) **May/June 2022**

1 hour 15 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.
- Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m / s^2).

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages.

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1 A student investigates the motion of a trolley as it travels down a slope.

(a) The student makes **two** measurements to determine the average speed of the trolley as it travels down the slope.

View solution

State the **two** measurements.
For each measurement, suggest the instrument used for making the measurement.

1. measurement ..... instrument used .....

2. measurement ..... instrument used .....

[2]

(b) Fig. 1.1 shows the speed–time graph for a different trolley as it travels down a slope.

View solution

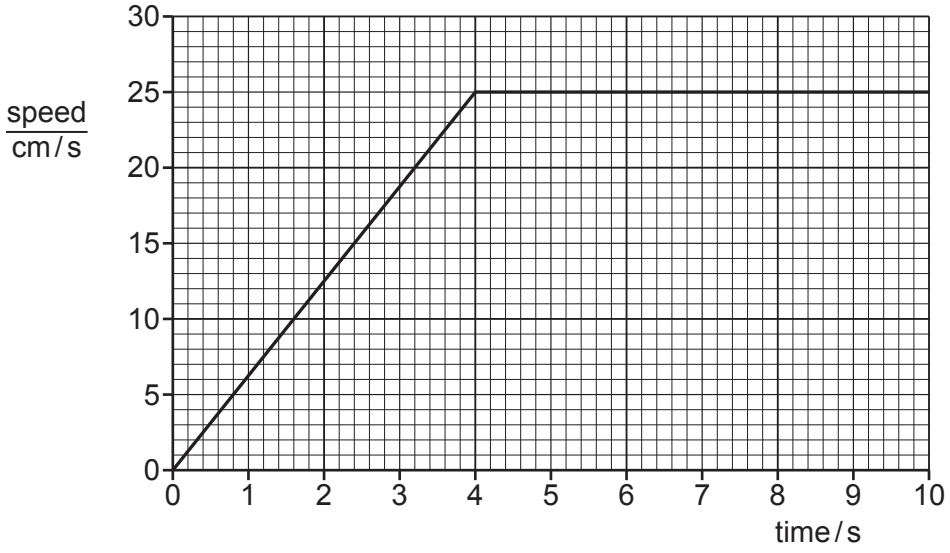

Fig. 1.1

(i) Determine the speed of the trolley at time = 2.0 s.

speed = ... cm / s [2]

(ii) Determine the distance moved by the trolley from time = 0 to time = 4.0 s.

distance = ... cm [3]

(iii) Using the information in Fig. 1.1, describe the motion of the trolley from time = 0 to time = 10 s.

.....

..... [2]

[Total: 9]

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2 Fig. 2.1 shows a closed textbook.

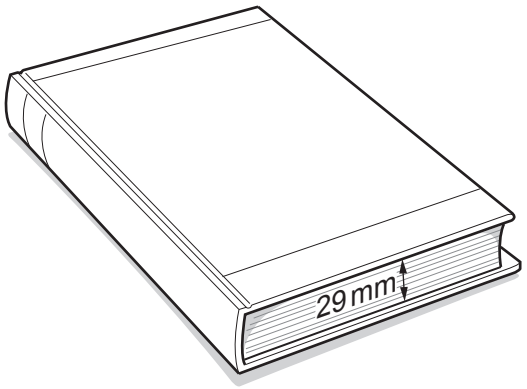

Fig. 2.1

(a) There are 270 sheets of paper in the textbook. The total thickness of the sheets is 29 mm.

View solution

Calculate the average thickness of **one** sheet of paper.

average thickness of one sheet = ... mm [3]

(b) The mass of the textbook is 1300 g.

View solution

Calculate the weight of the textbook.

weight = ... N [3]

[Total: 6]

3 **(a)** Fig. 3.1 shows an aeroplane flying. There are horizontal forces acting on the aeroplane, as shown in Fig. 3.1.

View solution

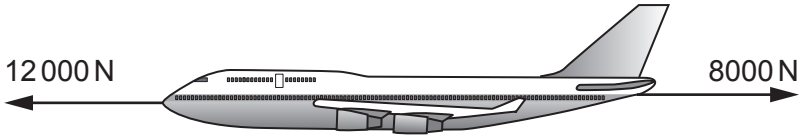

Fig. 3.1 (not to scale)

(i) Calculate the resultant horizontal force on the aeroplane.

resultant force = ... N

direction of resultant force .....

[3]

(ii) State the name of the effect producing the 8000 N force on the aeroplane. View solution

..... [1]

(iii) At a later time in the flight, the resultant horizontal force on the aeroplane is zero. View solution

Describe the horizontal motion of the aeroplane.

..... [1]

(b) Fig. 3.2 shows the handle used to open and close a cupboard door on the aeroplane. View solution

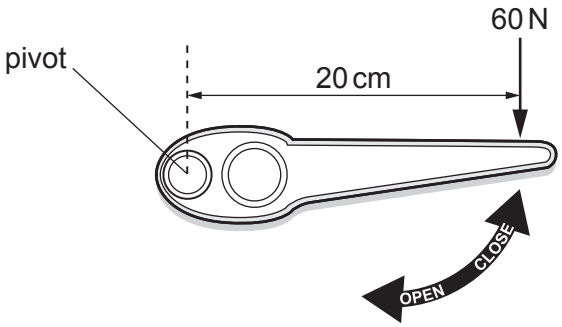

Fig. 3.2 (not to scale)

A force of 60 N acts at a distance of 20 cm from the pivot of the handle.

Calculate the moment of the 60 N force about the pivot.

moment = ... N cm [3]

[Total: 8]

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4 Fig. 4.1 shows parts of a coal-fired power station.

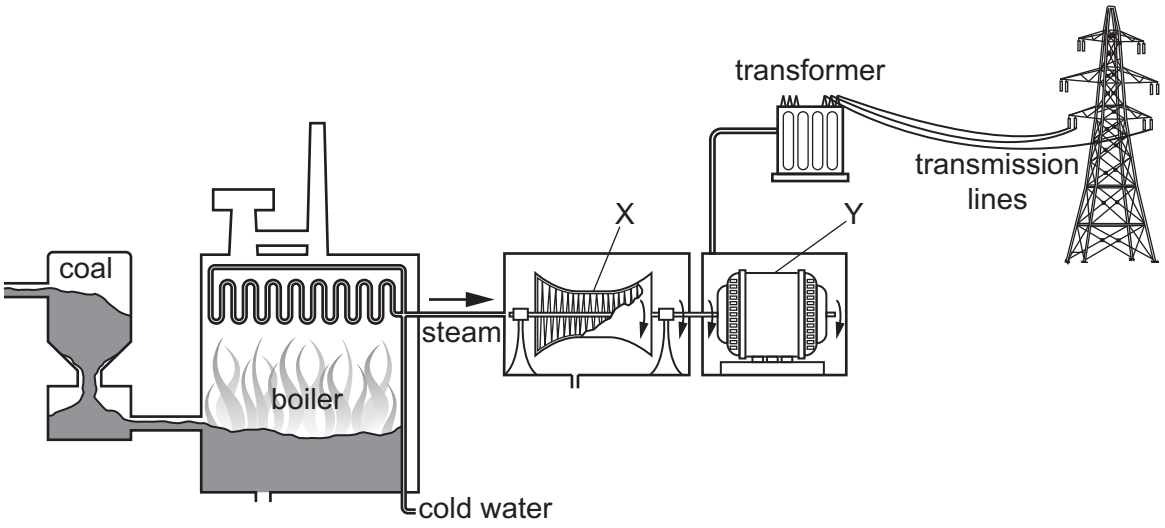

Fig. 4.1

(a) **(i)** State the names of the parts of the power station labelled X and Y.

View solution

X .....

Y .....

[2]

(ii) Describe **two** useful energy transfers in this power station.

View solution

1. .....

2. .....

[2]

(b) The power station contains a transformer. The primary voltage V_p for the transformer is 25 000 V.
The number of turns on the primary coil N_p is 600.
The number of turns on the secondary coil N_s is 4800.

View solution

Calculate the secondary voltage V_s for the transformer.

V_s = ... V [3]

(c) Give **two** reasons for transmitting electrical energy at very high voltages.

View solution

1. .....

.....

2. .....

.....

[2]

[Total: 9]

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5 Fig. 5.1 shows a cross-section of a flask. The flask is used to keep a liquid hot. The flask has two glass walls with a vacuum between them. The surfaces of the glass walls are shiny.

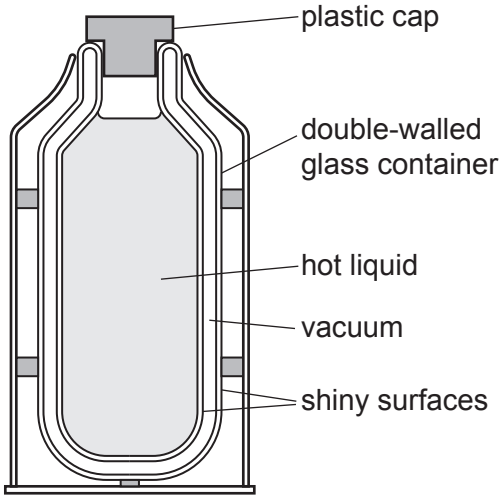

Fig. 5.1

View solution

(a) (i) Explain how the shiny surfaces reduce the transfer of thermal energy from the hot liquid.

.....

..... [2]

(ii) Explain how the vacuum reduces the transfer of thermal energy from the hot liquid.

View solution

.....

..... [2]

(b) Some of the hot liquid is poured out of the flask into a shallow dish.

View solution

Explain how evaporation causes the liquid to cool.

.....

.....

..... [3]

(c) A student uses a microscope to view a small particle in the liquid. Fig. 5.2 shows the path of the particle.

View solution

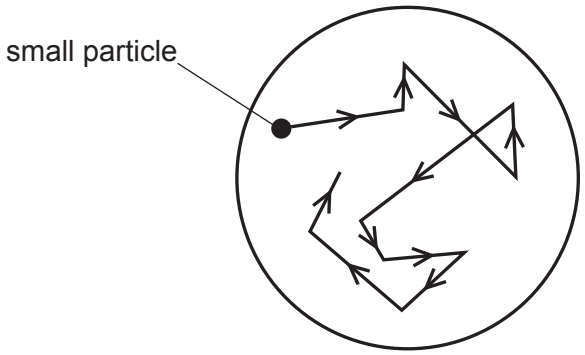

Fig. 5.2

(i) State the name given to the motion of the small particle.

..... [1]

(ii) Explain why the small particle moves as shown in Fig. 5.2.

View solution

.....

..... [2]

[Total: 10]

6 **(a)** Fig. 6.1 shows the main regions of the electromagnetic spectrum. Two of the regions are unlabelled.

radio waves	.....	.....	visible light	ultraviolet rays	X-rays	γ (gamma)-rays

Fig. 6.1

(i) Complete the labelling in Fig. 6.1. Write the name of the radiation in each unlabelled region. [2]

(ii) State the name of **one** region of the electromagnetic spectrum that has wavelengths shorter than those of ultraviolet rays.

..... [1]

View solution

(b) Fig. 6.2 represents a wave on a rope at one instant.

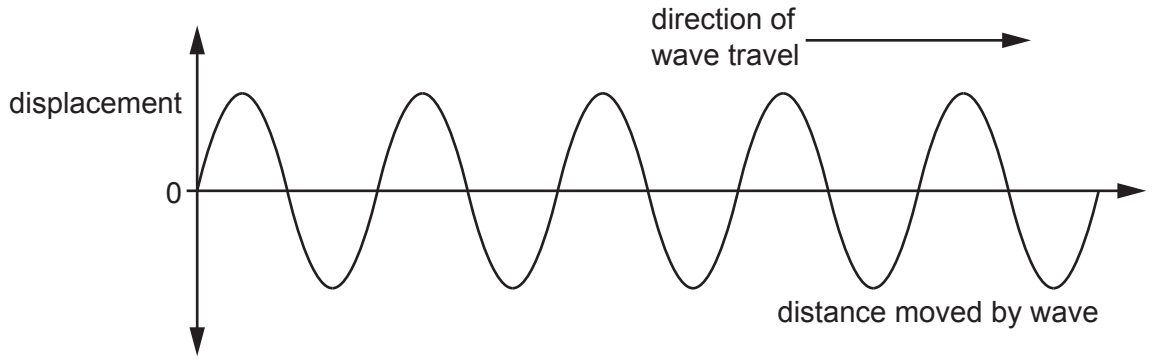

Fig. 6.2

On Fig. 6.2, draw a line representing **one** wavelength. Label the line L. [1]

(c) A student incorrectly writes some sentences about electromagnetic waves. His teacher circles a mistake in each sentence.

In Table 6.1, write a suitable correction for each mistake. The first one has been done for you.

Table 6.1

student's sentences	correction
The speed of light is (slower than) the speed of radio waves in a vacuum.	the same as
(Ultraviolet rays) are used in signals for satellite television and mobile phones.	
(Radio waves) are used to scan patients for broken bones.	

[2]

View solution

(d) Describe the difference between the vibrations of longitudinal waves and transverse waves.

.....

.....

..... [2]

[Total: 8]

View solution

7 **(a)** A student investigates refraction through a parallel-sided glass block. Fig. 7.1 shows a ray of red light travelling from the air through the glass block.

View solution

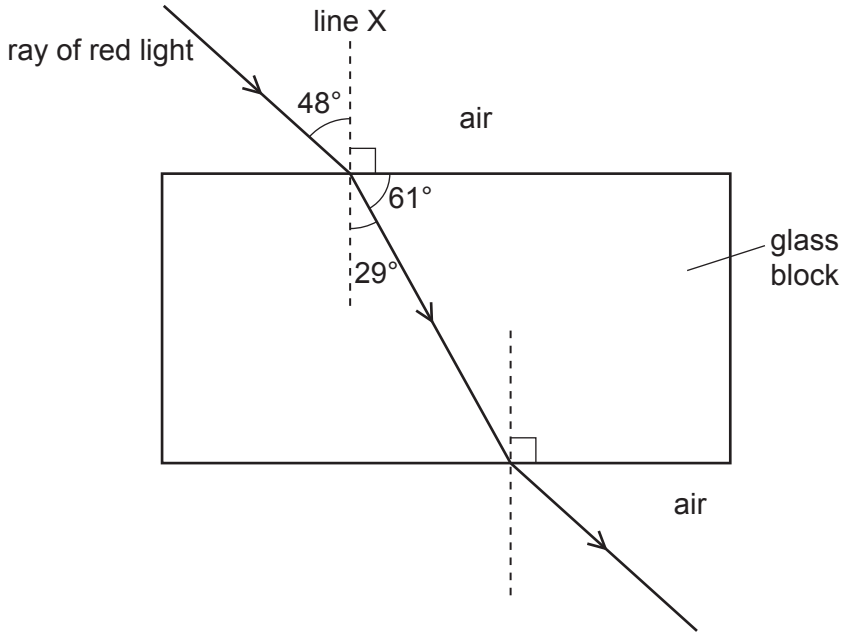

Fig. 7.1

(i) Using the information in Fig. 7.1, state the angle of refraction for the ray of red light travelling from air into the glass block.

angle of refraction = ... ° [1]

(ii) Using the information in Fig. 7.1, state the term used for line X.

..... [1]

View solution

(b) Fig. 7.2 shows an object OX to the left of a thin converging lens. The principal focus on each side of the lens is labelled F.

View solution

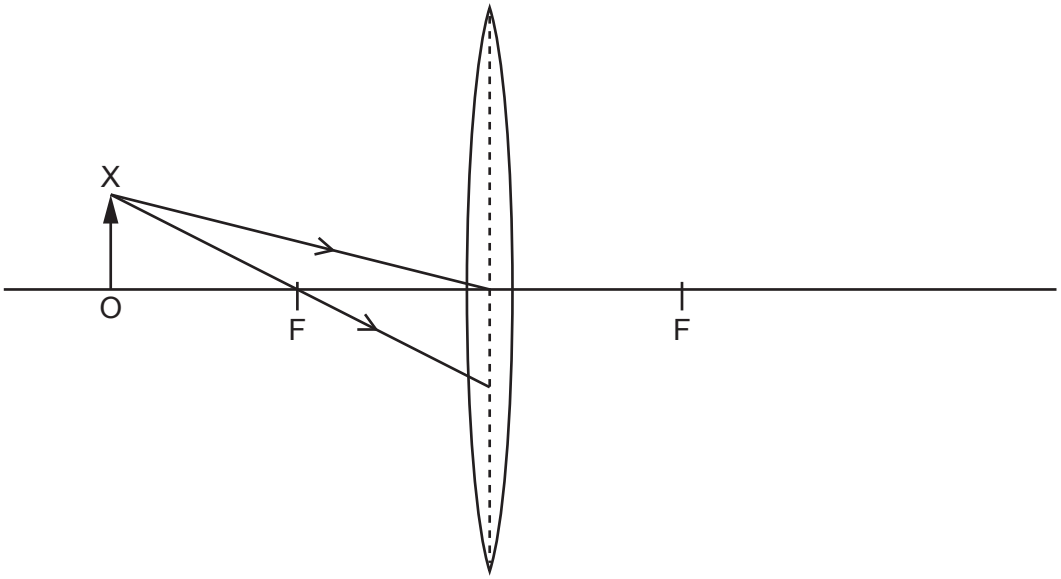

Fig. 7.2

(i) Two rays from the top of the object are incident on the lens, as shown in Fig. 7.2.

On Fig. 7.2, continue the paths of these two rays to show the position of the image of OX formed by the lens. [2]

(ii) Draw the image of OX formed by the lens. [1]

[Total: 5]

View solution

8 **(a)** A student has a box containing objects made of different materials. The objects are:

View solution

aluminium foil **a silver ring** **an iron bar**

a plastic strip **a glass lens**

(i) State which objects are made of electrically insulating materials.

..... [1]

(ii) State which object is made of a magnetic material.

View solution

..... [1]

(b) Fig. 8.1 shows two magnets, X and Y. The magnets are attracting each other.

View solution

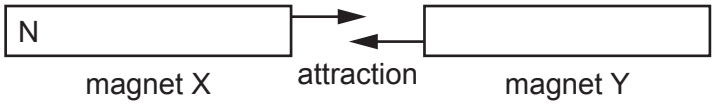

Fig. 8.1

On magnet X, the N pole is labelled N.

On Fig. 8.1, complete the labelling for the magnetic poles of each magnet. [1]

(c) The student attaches a thin cotton thread to each of two light metal spheres, P and Q. She suspends the spheres as shown in Fig. 8.2.

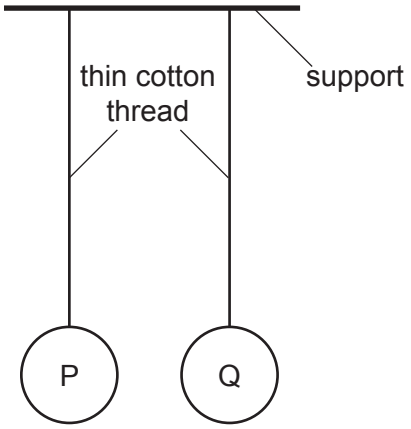

Fig. 8.2

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(i) The student puts a positive charge on sphere P only.

View solution

Complete the diagram in Fig. 8.3 to show the positions of the spheres.



Fig. 8.3

[1]

(ii) The student puts a positive charge on sphere P **and** on sphere Q.

View solution

Complete the diagram in Fig. 8.4 to show the positions of the spheres.



Fig. 8.4

[2]

[Total: 6]

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9 A student has a battery-operated torch. Fig. 9.1 shows the electrical components in the torch circuit.

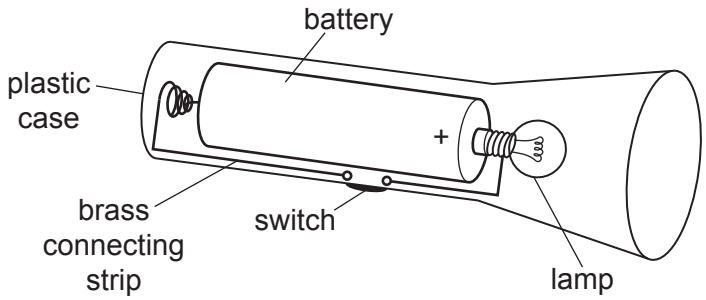

Fig. 9.1

(a) Using standard symbols, draw a circuit diagram for the circuit in the torch.

View solution

[4]

(b) When the torch is switched on, the potential difference (p.d.) across the lamp is 1.4 V and the current in the lamp is 0.26 A.

(i) State the current in the brass connecting strip.

View solution

current = ...A [1]

(ii) Calculate the resistance of the lamp.

View solution

resistance = ... Ω [3]

[Total: 8]

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10 (a) Fig. 10.1 shows a wire passing through a card. There is a large electric current in the wire in the direction shown.
Fig. 10.2 shows the same arrangement when viewed from above the card.

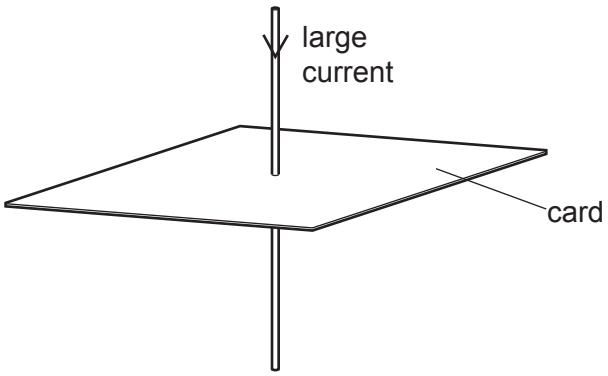

Fig. 10.1

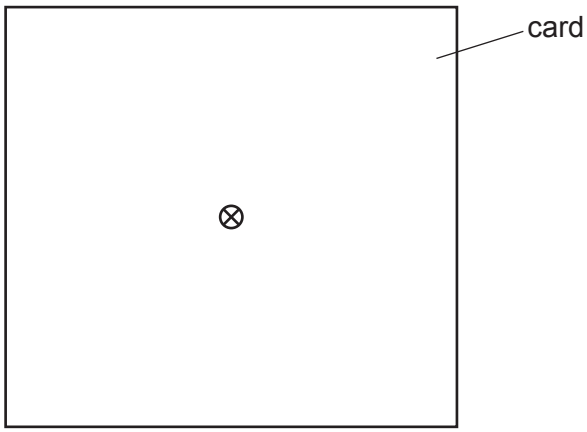

Fig. 10.2

There is a pattern of magnetic field lines around the wire due to the current in the wire.

On Fig. 10.2, draw the pattern and direction of the magnetic field as if viewed from above the card. [3]

(b) Fig. 10.3 shows a wire XY carrying a large electric current between the poles of a permanent magnet. There is an upward force on the wire XY.

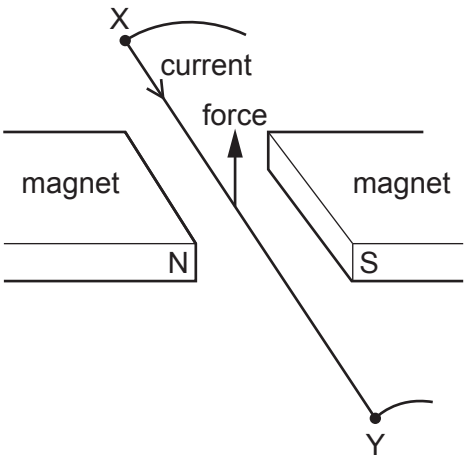

Fig. 10.3

(i) State **two** different ways of increasing the force due to the current in the wire XY.

.....

..... [2]

(ii) State **two** different ways of making the force on the wire XY act downwards.

.....

..... [2]

[Total: 7]

11 (a) An isotope of americium has 95 protons and 146 neutrons in its nucleus.

Write the nuclide notation for the nucleus of this isotope. The chemical symbol for americium is Am.

View solution

[2]

(b) Fig. 11.1 shows how the count rate of a sample of americium changes with time.

View solution

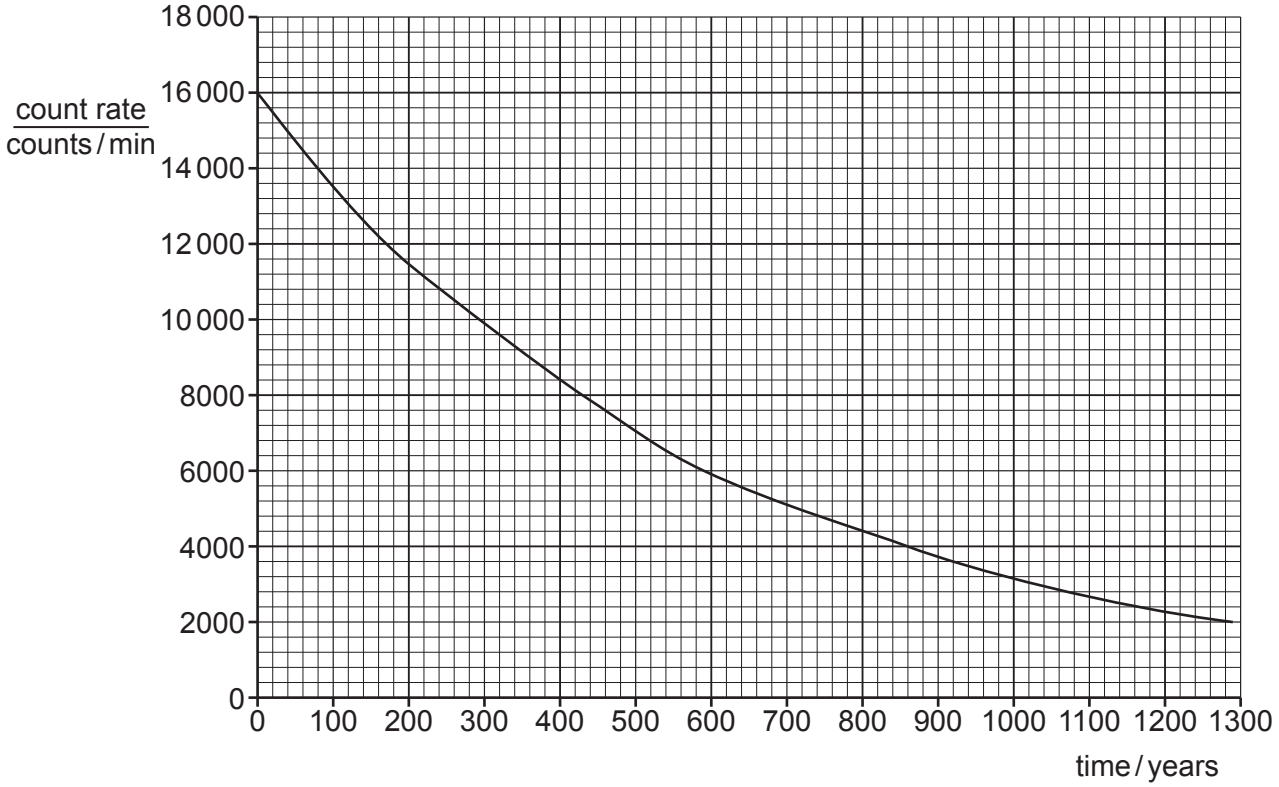

Fig. 11.1

Determine the half-life of the americium in the sample. Use information from Fig. 11.1.

half-life = ... years [2]

[Total: 4]

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