Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICS **0625/23**

Paper 2 Multiple Choice (Extended) **October/November 2023**

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- Take the weight of 1.0 kg to be 9.8 N (acceleration of free fall = 9.8 m / s^2).

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.

This document has **20** pages. Any blank pages are indicated.

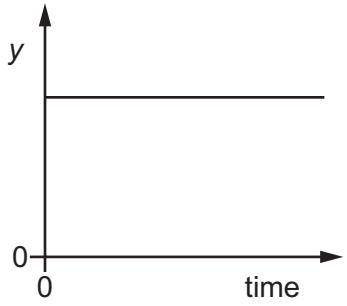
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1 How many of the quantities shown are scalars?

mass momentum density energy

A 1 **B** 2 **C** 3 **D** 4

2 A train is on a straight track. The graph shows how a quantity *y* varies with time.



Which statements can be true?

1 The train is stationary and *y* represents the distance from the last station.

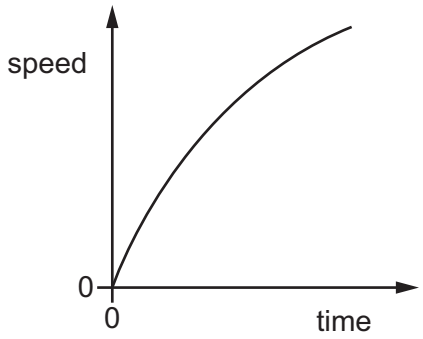
2 The train is moving and *y* represents the distance from the last station.

3 The train is stationary and *y* represents the speed of the train.

4 The train is moving and *y* represents the speed of the train.

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

3 The diagram shows a speed–time graph for a moving object.



Which description of the object's motion is correct?

A decreasing acceleration

B decreasing speed

C constant acceleration

D constant speed

4 The mass of air hitting the blades of a wind turbine each second is 1.5×10^4 kg.

The speed of the air is 4.0 m / s.

The density of air is 1.2 kg / m^3.



Which row gives the volume of the air hitting the blades each second and the kinetic energy of the air hitting the blades each second?

	volume of air each second / m^3	kinetic energy each second / J
A	13 000	72 000
B	13 000	120 000
C	18 000	72 000
D	18 000	120 000

5 An object moves in a circle at constant speed.

Which statement about the force needed on the object is correct?

A A force away from the centre of the circle keeps the object moving in the circle.

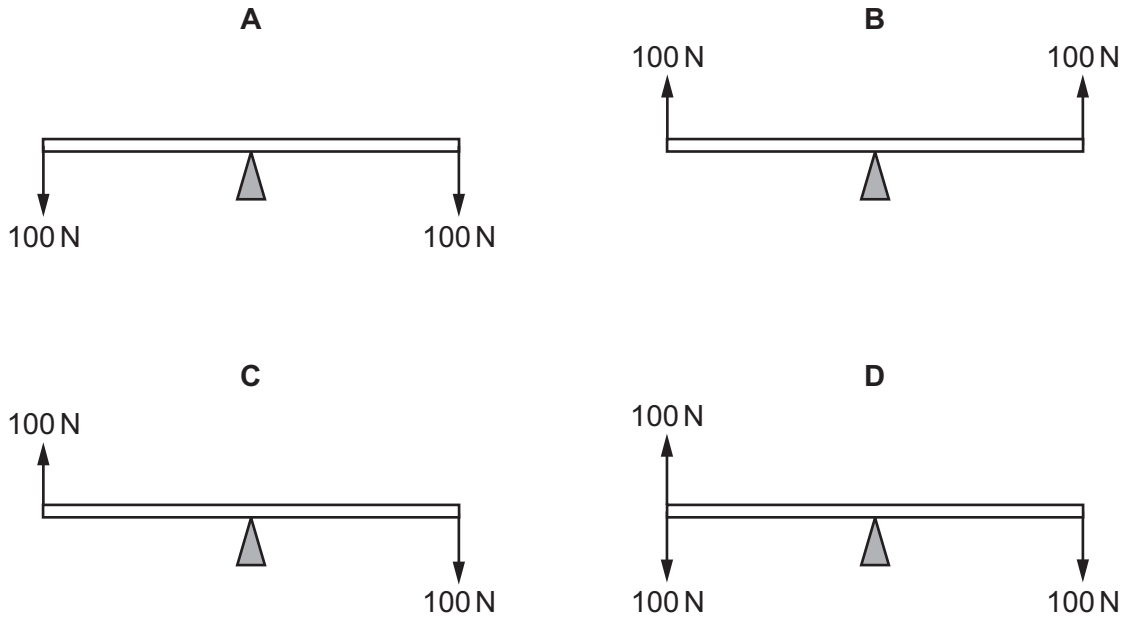
B A force in the direction of motion of the object keeps it moving in the circle.

C A force towards the centre of the circle keeps the object moving in the circle.

D No force is needed to keep the object moving at constant speed in the circle.

6 A uniform rod rests on a pivot at its centre. The rod is not attached to the pivot. Forces are then applied to the rod in four different ways, as shown. The weight of the rod can be ignored.

Which diagram shows the rod in equilibrium?



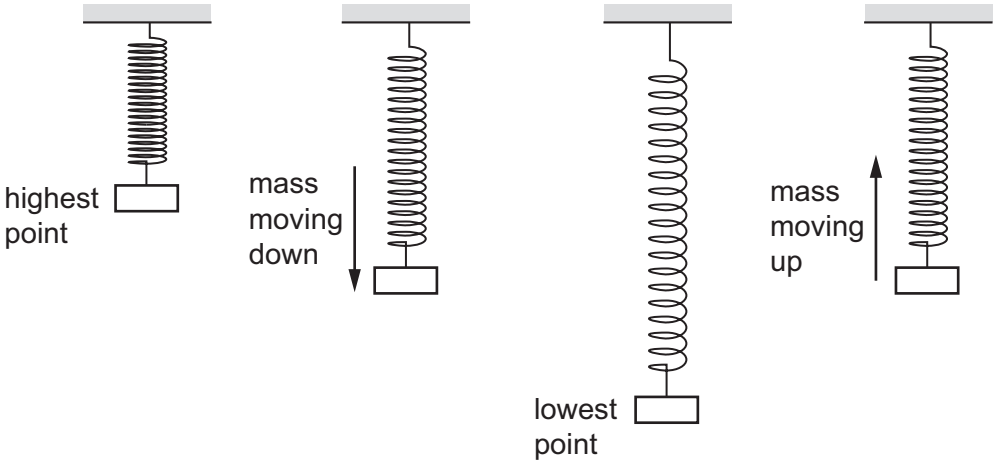
7 A car of mass 1200 kg is travelling along a straight horizontal road.

Which impulse is needed to accelerate the car from 5.0 m / s to 10 m / s?

A 6000 N s **B** 12 000 N s **C** 15 000 N s **D** 18 000 N s

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8 A mass bounces up and down on a steel spring. The diagram shows the mass and the spring at different points during the motion.



At which point is the least energy in the gravitational potential store of the mass and at which point is the most energy in the elastic store of the spring?

	least energy in gravitational potential store of the mass	most energy in the elastic store of the spring
A	mass moving down	mass moving up
B	mass moving down	lowest point
C	lowest point	mass moving up
D	lowest point	lowest point

9 A boy uses a rope to pull an object of mass m up a slope.

The rope is parallel to the slope.

The tension in the rope is constant and of value F.

The object moves a distance d along the slope and rises through a height h.

How much work is done by the boy?

A $F \times d$

B $F \times h$

C $m \times g \times h \times d$

D $m \times g \times h^2$

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10 A microwave oven is rated at 900 watts.

Which statement correctly describes the meaning of this value?

A 900 joules are transferred every second.

B 900 amperes are transferred every second.

C 900 volts are transferred every second.

D 900 ohms are transferred every second.

11 An object is immersed in a liquid of density ρ. The pressure at this depth due to the liquid is p. The gravitational field strength is g.

What is the equation for the depth h of the object beneath the surface?

A $h = p\rho g$ **B** $h = \frac{\rho g}{p}$ **C** $h = \frac{p}{\rho g}$ **D** $h = \frac{pg}{\rho}$

12 A sealed bottle of constant volume contains air.

The air in the bottle is heated by the Sun.

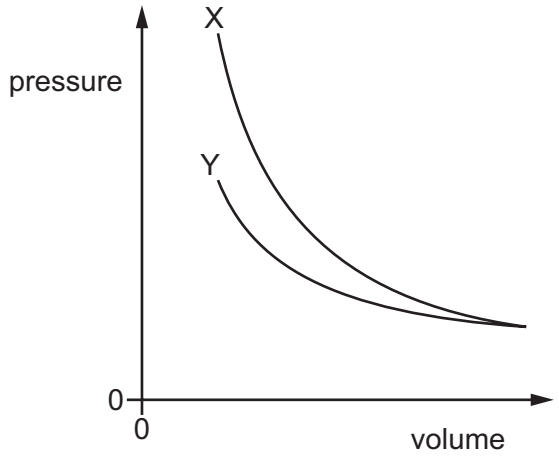
What is the effect on the average speed of the air particles in the bottle and the average distance between them?

	average speed of air particles	average distance between air particles
A	decreases	decreases
B	decreases	stays the same
C	increases	increases
D	increases	stays the same

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13 In an experiment to investigate the relationship between the volume of a sample of air and its pressure, the volume of the sample is decreased and its pressure is measured continuously.

Curve X on the graph shows the results that would be expected for a fixed mass of air at constant temperature. Curve Y shows the results that are obtained in this particular experiment.



Which row shows two possible reasons why curve Y is different from curve X?

	1	2
A	the temperature of the air **increases** as the volume is decreased	air leaks **into** the container as the volume is decreased
B	the temperature of the air **increases** as the volume is decreased	air leaks **out of** the container as the volume is decreased
C	the temperature of the air **decreases** as the volume is decreased	air leaks **into** the container as the volume is decreased
D	the temperature of the air **decreases** as the volume is decreased	air leaks **out of** the container as the volume is decreased

14 A student splashes water on to her face. Here are three statements about the effects.

P The water uses energy to evaporate.

Q The water gains energy from the student.

R The face of the student cools.

Which statements are correct?

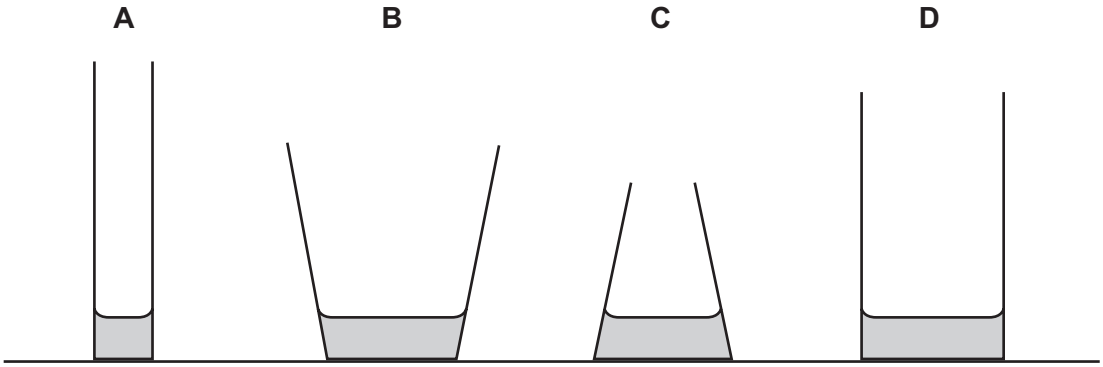
A P and Q only **B** P and R only **C** Q and R only **D** P, Q and R

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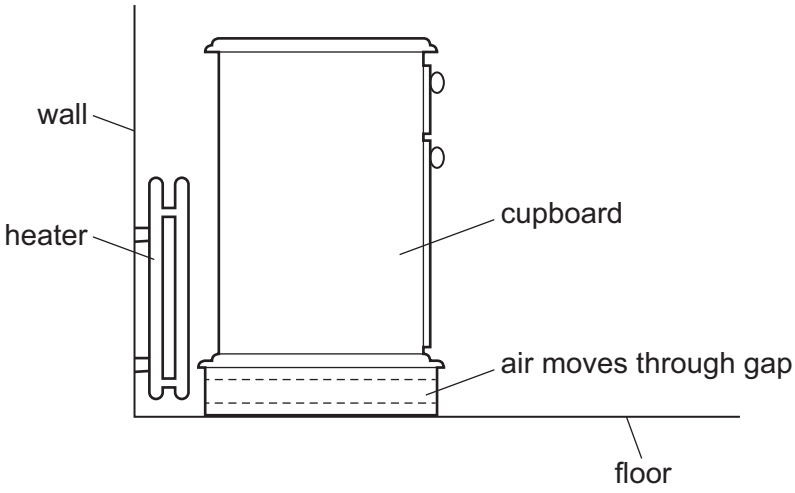
15 Four containers each contain water.

More water at the same temperature is added to each container.

From which container does water now evaporate more slowly than it did before?



16 A cupboard is placed in front of a heater. Air can move through a gap under the cupboard.



Which row describes the temperature and the direction of movement of the air in the gap?

	air temperature	air direction
A	cool	away from the heater
B	cool	towards the heater
C	warm	away from the heater
D	warm	towards the heater

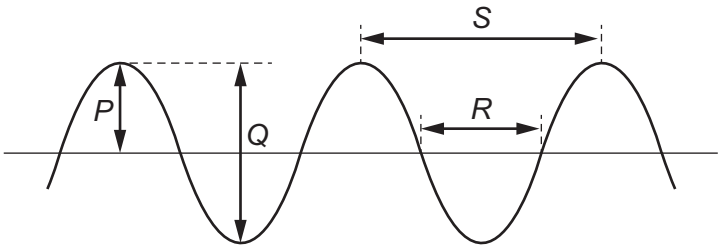
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17 Light diffracts when it enters a telescope. This causes the image to blur slightly. The amount of diffraction depends on the diameter of the hole through which the light enters the telescope and the wavelength of the light.

Which combination for diameter and wavelength will result in the sharpest image (least blurring)?

	diameter	wavelength
A	large	long
B	large	short
C	small	long
D	small	short

18 The diagram shows a transverse wave.

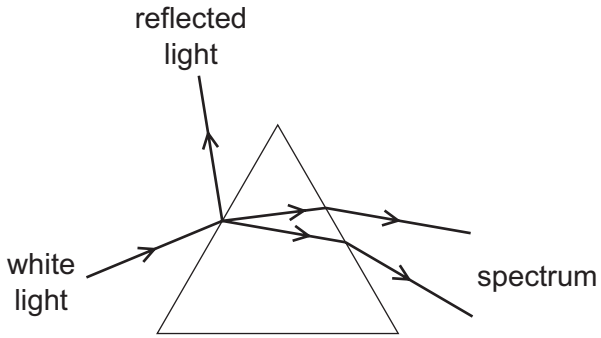


Which row identifies the amplitude and the wavelength of the wave?

	amplitude	wavelength
A	*P*	*R*
B	*P*	*S*
C	*Q*	*R*
D	*Q*	*S*

19 The diagram shows the effect of a prism on white light.

Some light is reflected on striking the prism and some is refracted and dispersed to form a spectrum.



What happens if monochromatic light is used instead of white light?

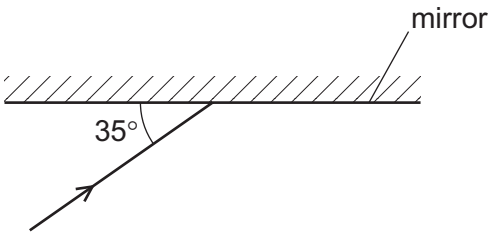
A The light changes colour as it passes through the prism.

B The light forms a brighter spectrum.

C There is no reflected light.

D There is no dispersion of the emerging light.

20 The diagram shows a ray of light incident on a plane mirror.



The angle between the ray and the mirror is 35°.

The ray is reflected by the mirror.

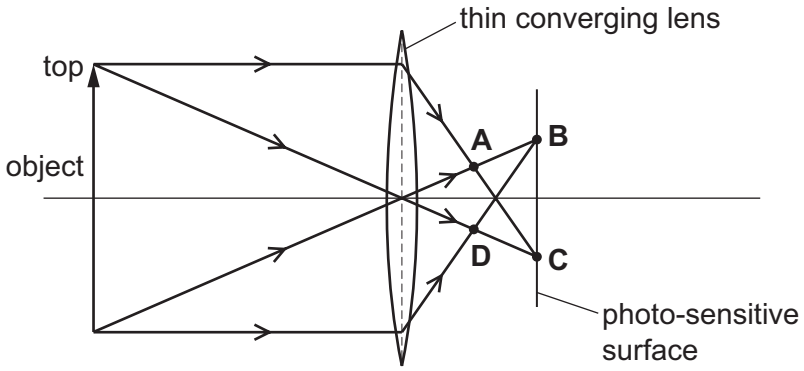
What is the angle of reflection?

A 35° **B** 55° **C** 70° **D** 110°

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21 A thin converging lens in a camera produces a real image on a photo-sensitive surface, as shown.

At which position is the image of the top of the object formed?



22 Light is travelling through air. It strikes a glass block at an angle of incidence of 45°. The glass has a refractive index of 1.4.

What is the angle of refraction of the light as it enters the glass?

A 29° **B** 30° **C** 32° **D** 82°

23 Which row gives approximate values for the speed of sound in copper, water and air?

	speed of sound in copper m/s	speed of sound in water m/s	speed of sound in air m/s
A	4500	1500	350
B	350	4500	1500
C	1500	4500	350
D	4500	350	1500

24 Which metal can be attracted by a magnet?

A zinc

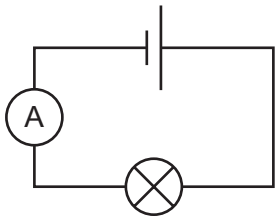
B lead

C iron

D copper

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25 The diagram shows an electric circuit.



In which direction do free electrons flow around this circuit and what quantity does the ammeter measure?

	direction of electron flow	quantity measured by the ammeter
A	anticlockwise	charge passing each point in the circuit per unit time
B	anticlockwise	total charge passing through the ammeter
C	clockwise	charge passing each point in the circuit per unit time
D	clockwise	total charge passing through the ammeter

26 Which substances both contain large concentrations of free electrons?

A aluminium and glass

B copper and water

C copper and nylon

D silver and gold

27 A resistance wire of length L melts and has to be replaced with a wire of the same material and the same resistance. The only wire available has twice the diameter of the broken wire.

Which length of this wire should be used?

A $\frac{L}{4}$ **B** $\frac{L}{2}$ **C** $2L$ **D** $4L$

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28 A teacher wishes to show the production of electrostatic charges.

She holds a rod and rubs it with a cotton cloth. A copper rod, a glass rod, a plastic rod and a steel rod are available.

Which two rods would both be suitable to use?

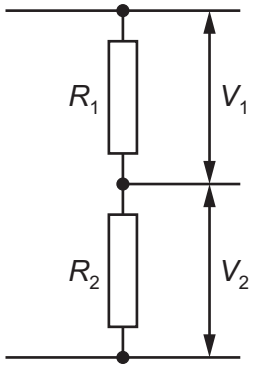
A a copper rod and a glass rod

B a glass rod and a plastic rod

C a plastic rod and a copper rod

D a plastic rod and a steel rod

29 Two resistors, with resistances R_1 and R_2, are used as a potential divider.



What is the relationship between R_1, R_2 and potential differences V_1 and V_2?

A $R_1 \times R_2 = V_1 \times V_2$

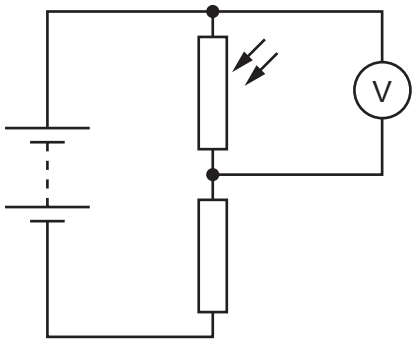
B $R_1 \times V_1 = R_2 \times V_2$

C $\frac{R_1}{R_2} = V_1 \times V_2$

D $\frac{R_1}{R_2} = \frac{V_1}{V_2}$

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30 The diagram shows a light-dependent resistor (LDR) connected in a potential divider circuit.



The brightness of the light falling on the LDR is increased.

Which row shows what happens to the resistance of the LDR and what happens to the reading on the voltmeter?

	resistance of LDR	reading on voltmeter
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

31 A simple a.c. generator has a coil rotating in a magnetic field.

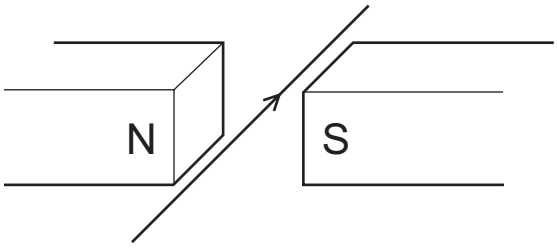
What happens to the peak electromotive force (e.m.f.) and to the frequency of the a.c. output when the coil is rotated faster?

	peak e.m.f.	frequency
A	greater	greater
B	greater	no change
C	no change	greater
D	no change	no change

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32 A current passes along a wire placed between the poles of a permanent magnet.

The wire experiences a force due to the magnetic field.



What will change the direction of this force?

A increasing the current

B reversing the current

C increasing the strength of the magnetic field

D using an electromagnet with the same polarity as the permanent magnet

33 What is a transformer used for?

A changing a direct current into an alternating current

B changing the magnitude of an alternating voltage

C reducing the frequency of an alternating current

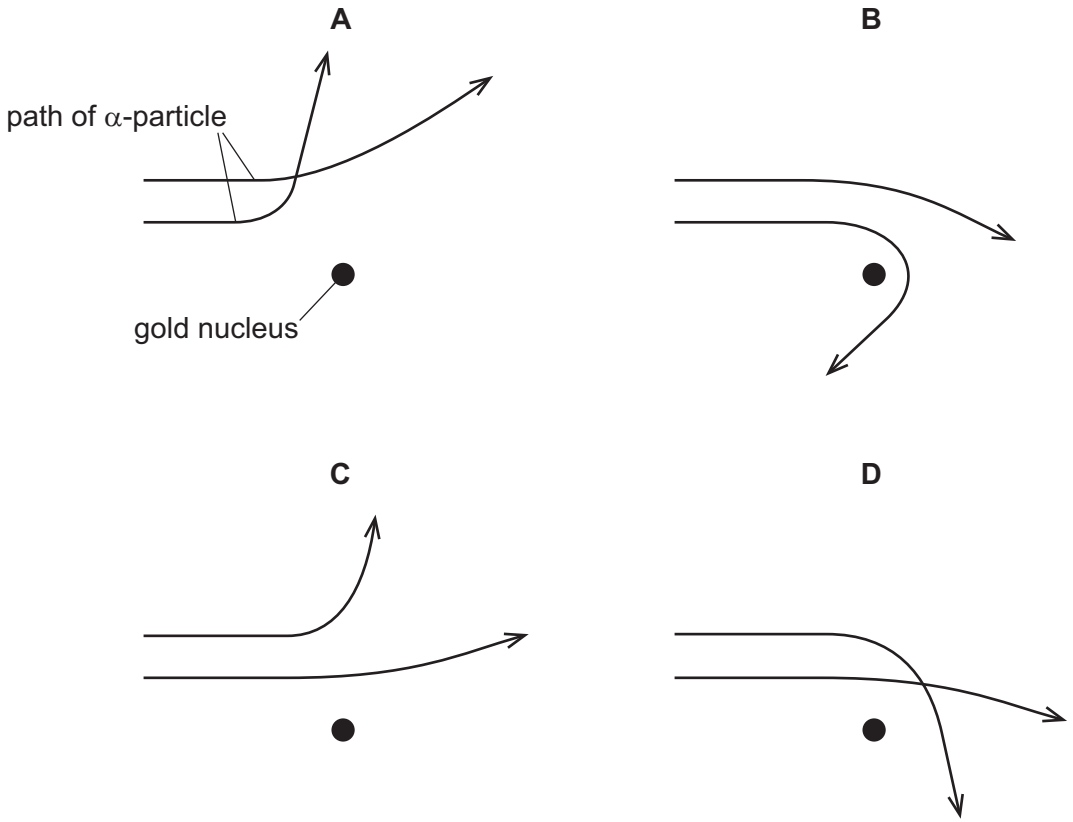
D switching off the current in a circuit when there is a fault

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34 The scattering of α-particles by a thin gold foil provides evidence for the nuclear model of the atom.

Two α-particles of the same energy are incident on a nucleus of gold.

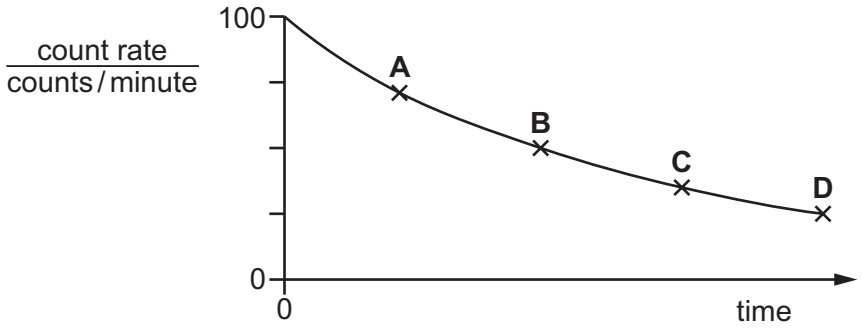
Which diagram shows the correct paths followed by the α-particles as they pass close to the nucleus?



35 The half-life of carbon-14 is 5700 years.

An object containing carbon-14 has a count rate of 100 counts / minute when it is first formed. The graph shows how the count rate decreases over time.

Which point on the graph corresponds to a time 11 400 years after the formation of the object?



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36 Why are beta-particles deflected more strongly than alpha-particles when they enter an electric field?

A Beta-particles have less mass than alpha-particles.

B Beta-particles are negatively charged.

C Beta-particles have lower velocities than alpha-particles.

D Beta-particles have more ionising power than alpha-particles.

37 Which statement describes how nuclear energy is released by fission in a nuclear power station?

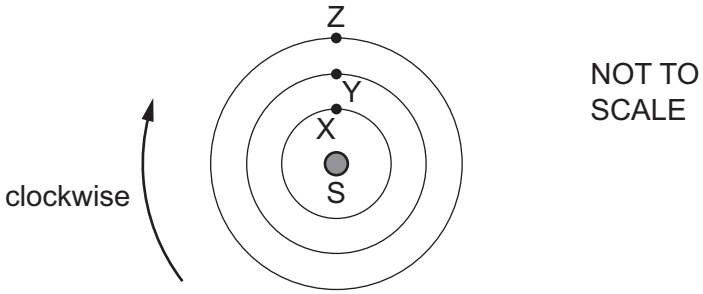
A Atoms join together to make molecules.

B Heavy nuclei split into lighter nuclei.

C Light nuclei join together to form heavier nuclei.

D Molecules break down into atoms.

38 The diagram shows a star S and the initial arrangement of three planets, X, Y and Z.



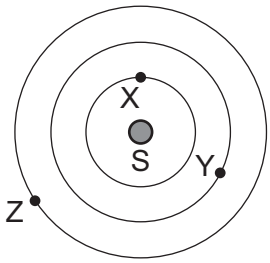
Each planet orbits clockwise in a circle about S.

The time for one orbit of Y is three times the time taken for one orbit of X.

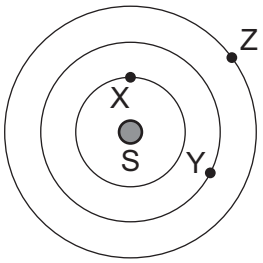
The time for one orbit of Z is twice the time taken for one orbit of Y.

Starting from the initial arrangement, which diagram shows the positions of the planets after X has made one complete orbit?

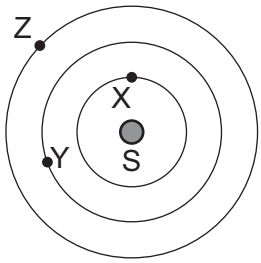
A



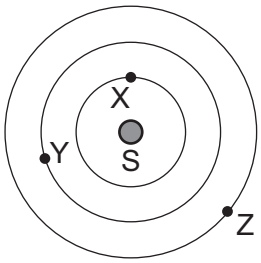
B



C



D



39 The nearest star to the Sun is about four light-years away from the Earth.

A student makes three statements about the star.

1 Light from the star takes about four years to reach the Earth.

2 Light from the Sun takes about four years to travel to the star and back to the Earth.

3 The star is outside our galaxy.

Which statements are correct?

A 1, 2 and 3 **B** 1 and 3 only **C** 1 only **D** 2 and 3 only

40 A planet orbits the Sun with orbital period T. The average radius of the orbit is r.

What is the average orbital speed of the planet?

A $2\pi rT$ **B** $\frac{2\pi r}{T}$ **C** $\frac{T}{2\pi r}$ **D** $\frac{\pi r}{2T}$

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