

Name:	Class:	Class Register Number:
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中正中學

CHUNG CHENG HIGH SCHOOL (MAIN)

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PRELIMINARY EXAMINATION 2026 SECONDARY 4

PHYSICS

6091/01

Paper 1 Multiple Choice

31 August 2026

1 hour

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, class and class register number clearly in the spaces provided at the top of this page.

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 separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

The use of an approved scientific calculator is expected, where appropriate.

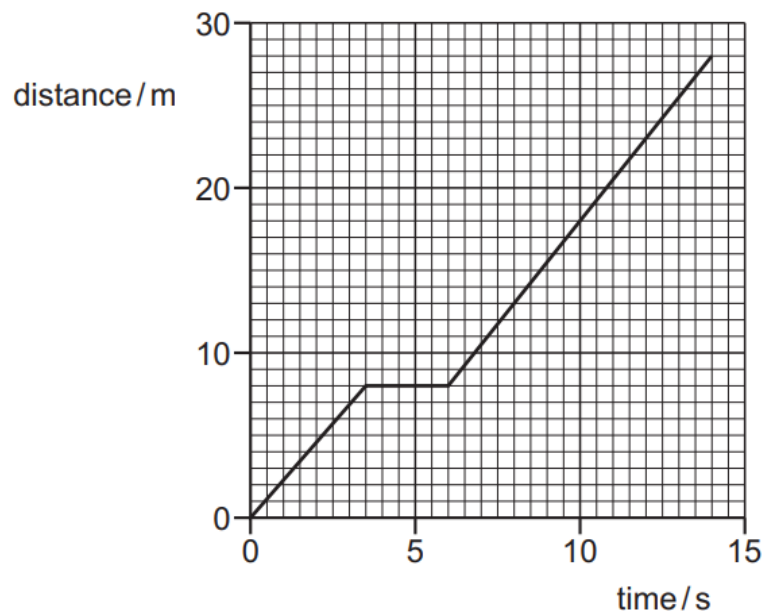
1 What is a reasonable estimate of the weight of an adult human?

- A** $7 \times 10^0 \text{ N}$ **B** $7 \times 10^1 \text{ N}$ **C** $7 \times 10^2 \text{ N}$ **D** $7 \times 10^3 \text{ N}$

2 Which statement about mass is correct?

- A** Mass is a scalar and its unit is the kilogram.
B Mass is a scalar and its unit is the newton.
C Mass is a vector and its unit is the kilogram.
D Mass is a vector and its unit is the newton.

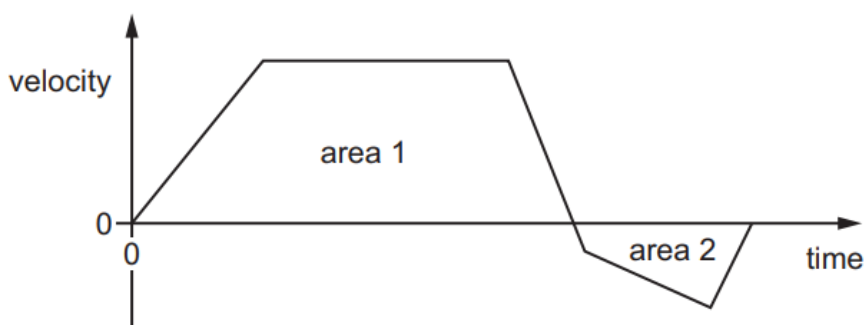
3 The graph shows the motion of a cyclist during a ride that lasts for 14 s.



What is the average speed of the cyclist for the ride?

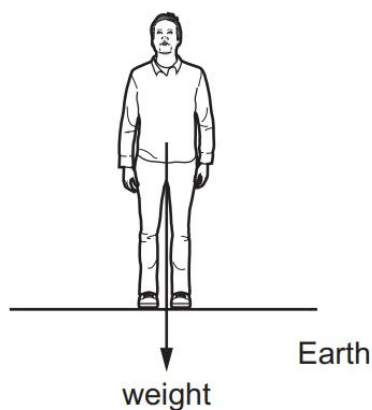
- A** 2.0 m/s **B** 2.3 m/s **C** 2.4 m/s **D** 2.5 m/s

- 4 The velocity–time graph for an object is shown.



Which expression gives the total displacement of the object?

- A area 1 – area 2
 - B $\frac{\text{area 1} + \text{area 2}}{2}$
 - C area 1 + area 2
 - D area 2 – area 1
- 5 A man stands at rest on the surface of the Earth.



The weight of the man is the gravitational force that acts on him.

According to Newton's third law, the weight of the man is one force in a pair of forces.

Which force is the other force in the pair?

- A a force downwards on the Earth
- B a force downwards on the man
- C a force upwards on the Earth
- D a force upwards on the man

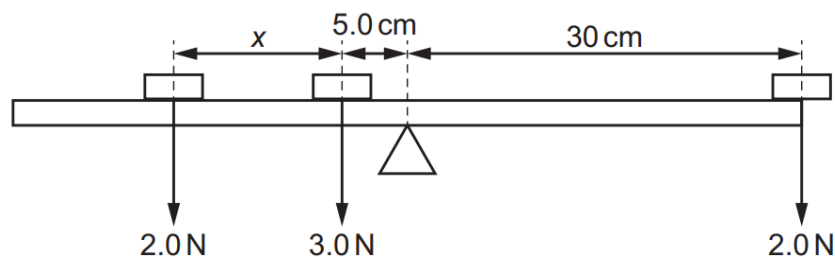
[Turn over

- 6 There is no atmosphere on the Moon.

Two metal spheres of identical volume but different mass are at rest at the same height above the ground on the Moon. The two spheres are dropped at the same time.

How do the spheres move after they are dropped?

- A The sphere with the larger mass has a smaller acceleration.
 - B The sphere with the larger mass hits the ground first.
 - C The sphere with the smaller mass has a smaller acceleration.
 - D The two spheres hit the ground together.
- 7 A uniform beam is pivoted at its centre and balanced by three weights as shown.



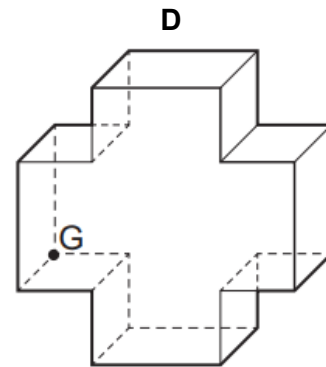
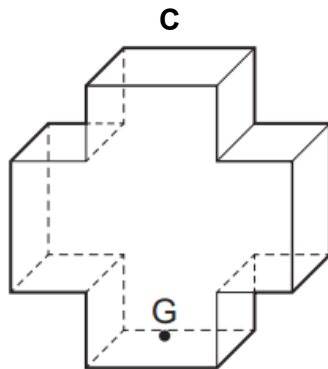
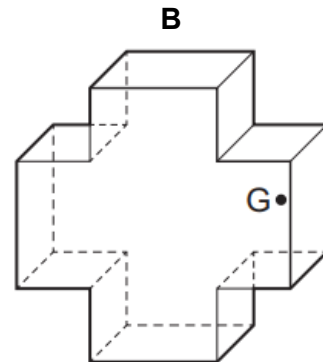
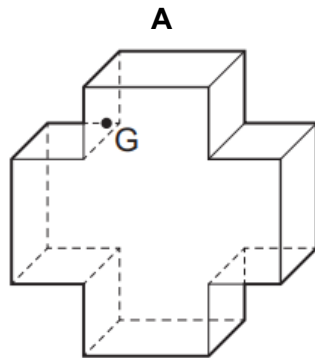
What is distance x ?

- A 17.5 cm
- B 22.5 cm
- C 35.0 cm
- D 37.5 cm

- 8 Four objects have identical shapes but different distributions of mass.

The centre of gravity of each object is shown by the dot marked G.

Which object is the most stable?



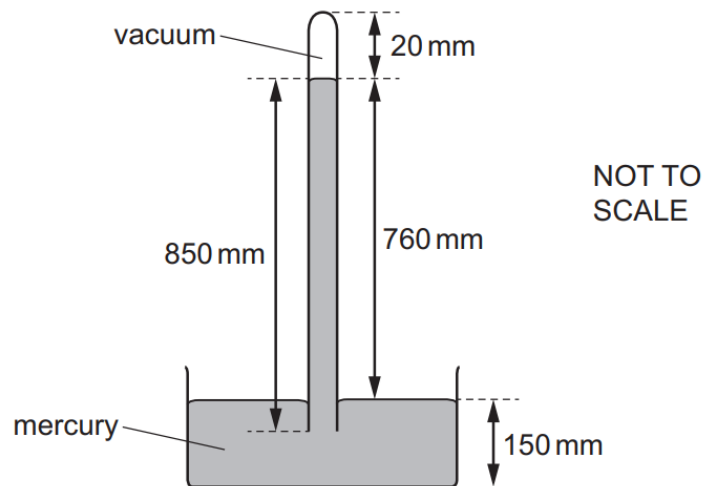
- 9 The mass and volume of an object are varied.

Which two changes, when made together, must increase the density of the object?

	mass	volume
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

[Turn over

- 10 The diagram shows an instrument that is used to measure the atmospheric pressure.



The density of mercury is $1.4 \times 10^4 \text{ kg/m}^3$.
The gravitational field strength of the Earth is 10 N/kg .

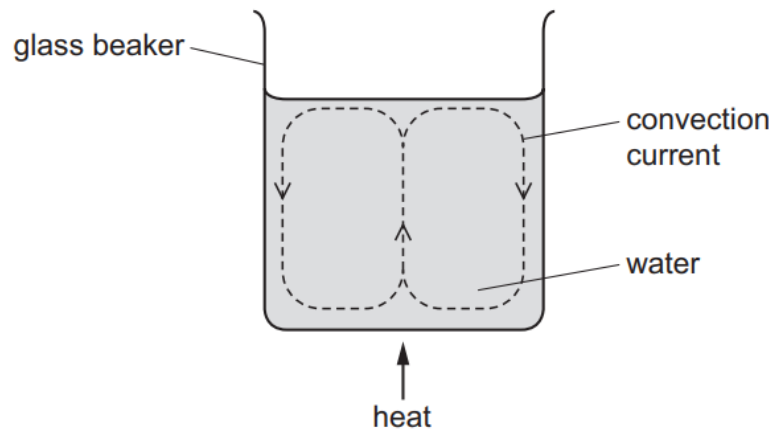
What is the atmospheric pressure?

- A** 2.8 kPa **B** 21 kPa **C** 106 kPa **D** 119 kPa
- 11 A rocket has mass M when empty. The rocket carries an additional mass M of fuel.
- The rocket and fuel travel at a speed v . When the engine of the rocket is fired, all of the fuel is expelled and the speed of the rocket increases to $2v$.
- What happens to the kinetic energy of the **rocket**?
- A** It doubles.
B It halves.
C It increases by a factor of four.
D It stays the same.
- 12 Which energy source is available constantly over a 24-hour period?
- A** natural gas
B solar cells
C tidal
D wind

13 In which example are the particles in fixed positions?

- A** ice in an ice cube
- B** water in a lake
- C** air in an air bubble
- D** water vapour in the atmosphere

14 A glass beaker contains water. When the centre of the base of the beaker is heated, a convection current is set up.



Which statement explains this?

- A** The evaporation of water causes water molecules to rise to the surface.
- B** The expansion of water molecules causes them to rise to the surface.
- C** The water above the heat source rises because it becomes less dense.
- D** The water at the side falls because it becomes less dense.

15 What is the colour and texture of the best absorber of infrared radiation?

- A** black and shiny
- B** black and dull
- C** white and shiny
- D** white and dull

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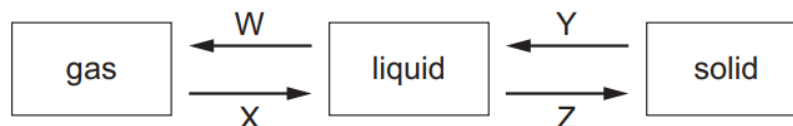
- 16** Solar panels are used to heat water with a mass of 500 kg.

The total area of the solar panels is 10 m^2 and the average power output from each square metre of the panels is 300 W. The specific heat capacity of water is $4200 \text{ J/(kg } ^\circ\text{C)}$.

What is the increase in the water temperature after 8.0 hours? (Assume there is no heat loss.)

- A** $0.69 \text{ } ^\circ\text{C}$ **B** $4.1 \text{ } ^\circ\text{C}$ **C** $5.1 \text{ } ^\circ\text{C}$ **D** $41 \text{ } ^\circ\text{C}$

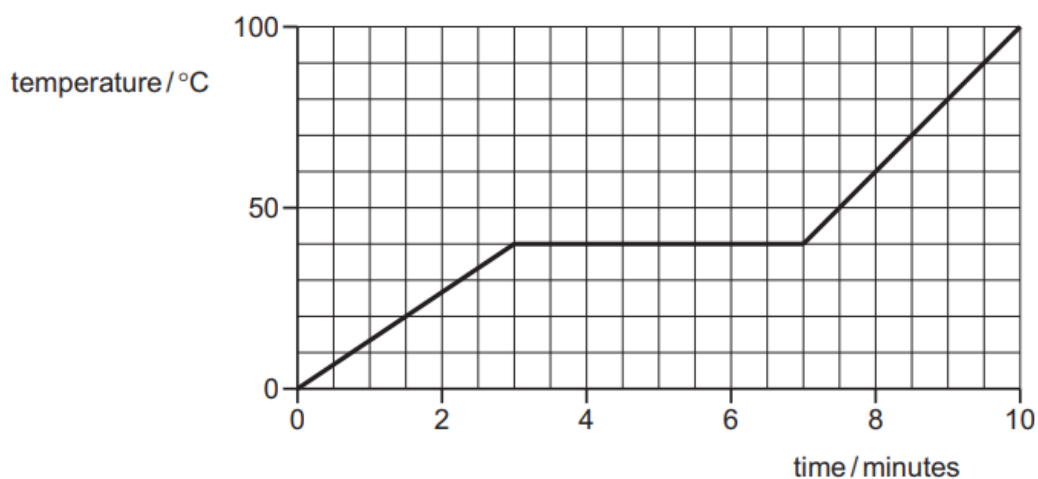
- 17** The diagram shows four changes of state, W, X, Y and Z.



Which row gives the names of the four changes of state?

	W	X	Y	Z
A	condensation	boiling	freezing	melting
B	condensation	boiling	melting	freezing
C	boiling	condensation	freezing	melting
D	boiling	condensation	melting	freezing

- 18** The graph is the temperature–time graph for a sample of wax that is heated so that it melts.



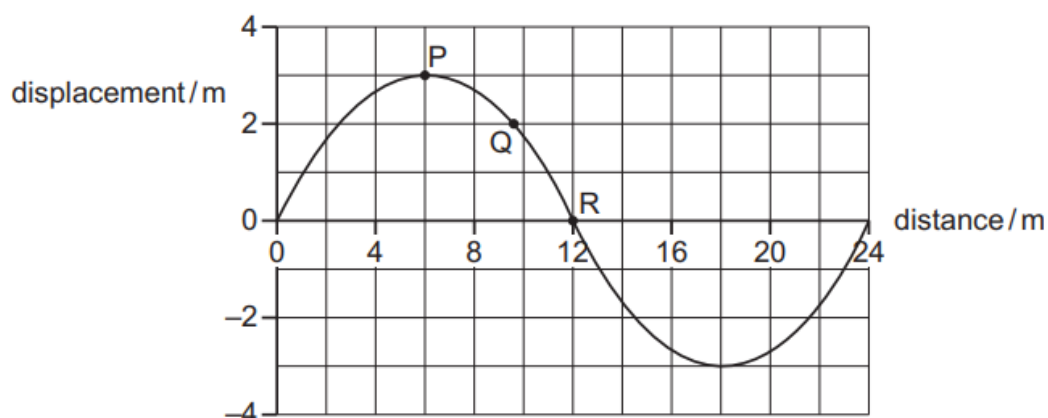
The mass of the wax is 200 g.

Energy is supplied to the wax at a constant rate of 12 000 J/minute.

What is the specific latent heat of fusion of the wax?

- A** 180 J/g **B** 240 J/g **C** 480 J/g **D** 600 J/g

- 19** The graph shows the variation with distance along the wave of the displacement of water particles at a particular instant in time for a transverse water wave.



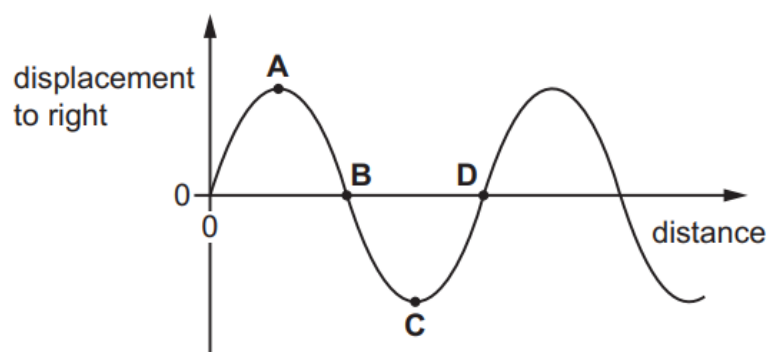
P, Q and R show the positions of three water particles in the wave.

Which particle has the greatest speed at the instant shown?

- A** all have the same speed
 - B** particle P
 - C** particle Q
 - D** particle R
- 20** A sound wave travels from the left to the right.

The graph shows the variation of the displacement to the right of particles in the sound wave with distance, at one instant.

Which letter represents the centre of a compression?



[Turn over

- 21** A ship uses ultrasound to measure the depth of the sea.

There is a time interval of 0.52 s between transmitting and detecting a pulse of ultrasound.

The speed of ultrasound in sea water is 1500 m/s.

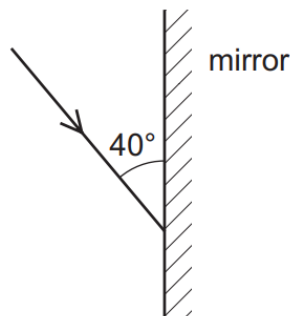
What is the depth of the sea?

- A** 390 m **B** 780 m **C** 1600 m **D** 5800 m

- 22** Which components of the electromagnetic spectrum are used to communicate from a remote controller to a television set and from the Earth to a satellite?

	remote controller to TV set	the Earth to a satellite
A	infrared	microwave
B	infrared	ultraviolet
C	light	microwave
D	light	ultraviolet

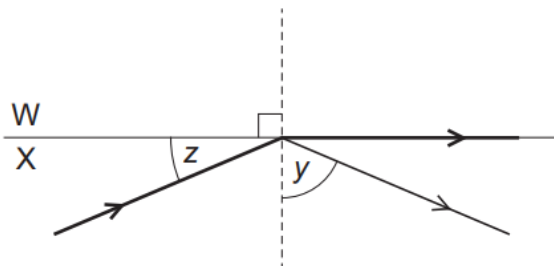
- 23** The diagram shows a ray of light directed at a plane mirror.



What are the angle of incidence and the angle of reflection?

	angle of incidence / °	angle of reflection / °
A	40	40
B	40	50
C	50	40
D	50	50

- 24** The diagram shows a ray of light incident on the boundary between two mediums W and X. The mediums have different refractive indexes.

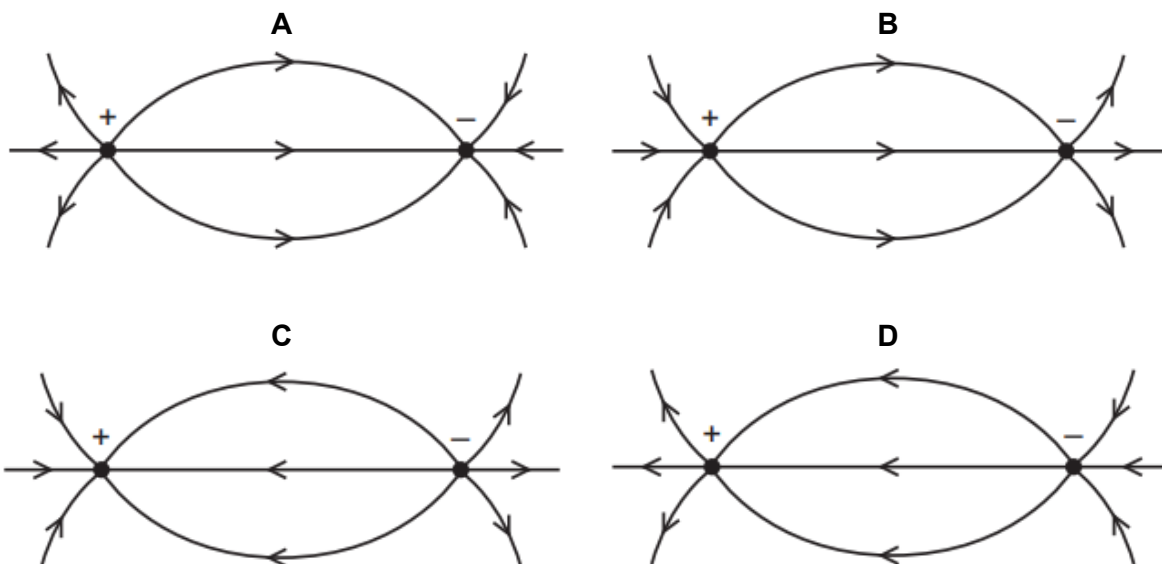


Some light is reflected and some passes along the surface between the two mediums. Angle y is greater than angle z .

Which statement is correct?

- A** W has a greater refractive index than X and angle y is equal to the critical angle.
 - B** W has a greater refractive index than X and angle z is equal to the critical angle.
 - C** X has a greater refractive index than W and angle y is equal to the critical angle.
 - D** X has a greater refractive index than W and angle z is equal to the critical angle.
- 25** Four diagrams representing the electric field between two oppositely-charged point charges are shown.

Which diagram correctly shows the electric field lines?



[Turn over

- 26** A plastic strip is rubbed with a cloth and the plastic becomes negatively charged.

Which statement explains this?

- A** Electrons are transferred from earth to the plastic.
- B** Electrons are transferred from the cloth to the plastic.
- C** Electrons move from one side of the plastic to the other side of the plastic.
- D** Protons are transferred from the plastic to the cloth.

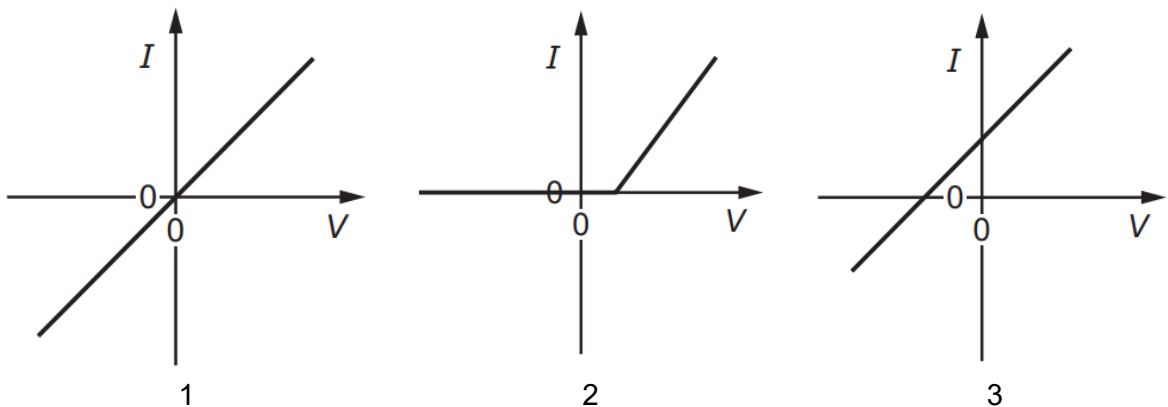
- 27** X is a piece of wire with length ℓ , area a and resistance R .

Wire Y is made from the same material and is connected to wire X to produce a component with a total resistance of $\frac{R}{2}$.

What are the dimensions of Y and how is it connected to X?

	length	area	connection
A	2ℓ	$0.25a$	in parallel
B	2ℓ	$0.25a$	in series
C	4ℓ	$4a$	in parallel
D	4ℓ	$4a$	in series

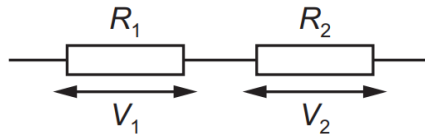
- 28** The I – V characteristics for three electrical components are shown.



Which components obey Ohm's law?

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

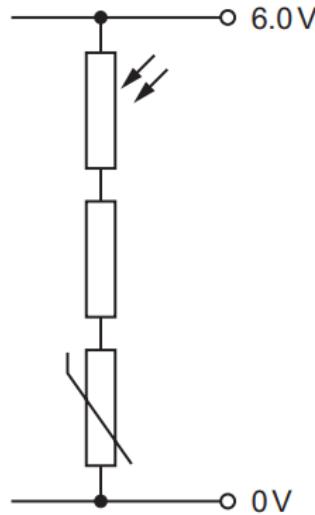
- 29 Two resistors connected in series act as a potential divider as shown.



The resistors have resistances R_1 and R_2 and the potential differences across them are V_1 and V_2 respectively.

Which expression is equal to $\frac{V_1}{V_2}$?

- A $\frac{R_1}{R_2}$ B $\frac{R_2}{R_1}$ C $(\frac{R_1}{R_2})^2$ D $(\frac{R_2}{R_1})^2$
- 30 A student connects a fixed resistor and two components whose resistances can change across a 6.0 V supply.



Under which conditions is the voltage across the fixed resistor the greatest?

- A cold and dark
B cold and bright
C warm and dark
D warm and bright

[Turn over

- 31** A kettle is connected to the 240 V mains supply using a plug containing a 13 A fuse.
The kettle contains water.

When it is switched on, the fuse blows. This happens again after a new fuse is fitted.

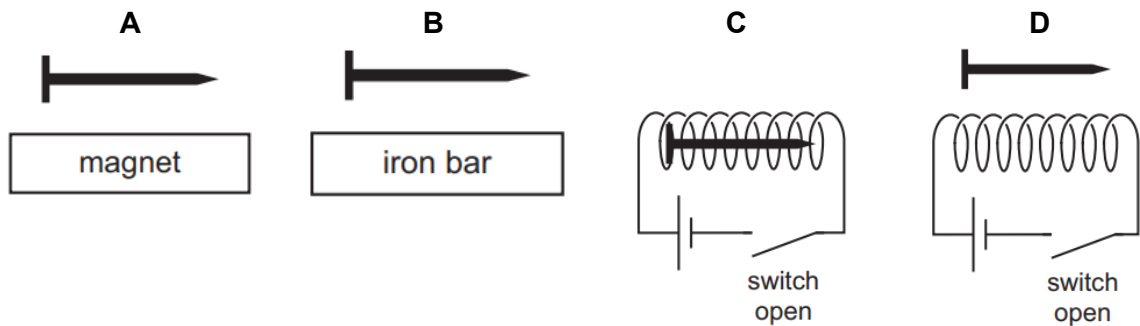
Someone replaces the fuse with a nail, and the kettle works.

What else might happen as a result of replacing the fuse with a nail?

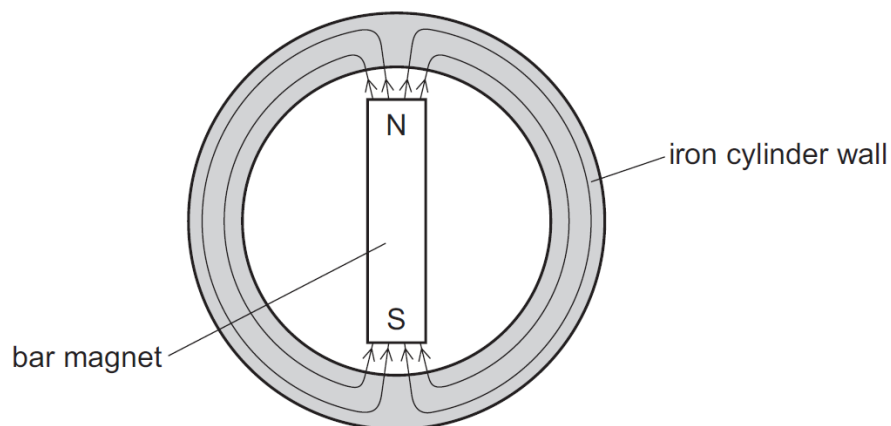
- A** A very large current overloads the wiring, causing a fire.
- B** The risk of electrocution by touching a 'live' wire increases.
- C** The kettle uses more energy to boil the water.
- D** The water boils at a higher temperature.

- 32** The diagrams show an iron nail in four different situations.

In which diagram is the nail an induced magnet?



- 33** A bar magnet is placed in a hollow iron cylinder. The diagram shows the magnetic field pattern produced.

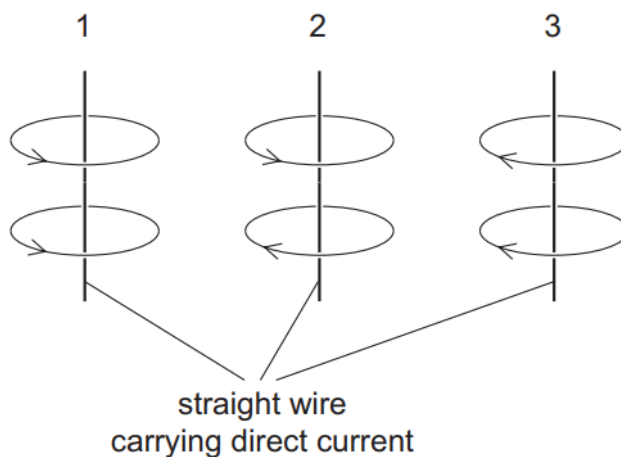


What is the cause of the field inside the cylinder wall?

- A** electromagnetic generation
B electromagnetic induction
C electrostatic induction
D magnetic induction
- 34** Students are asked to draw the pattern and direction of the magnetic field due to a direct current (d.c.) in a straight wire.

Diagrams 1, 2 and 3 are three of their answers.

The students do not know the direction of the current in the wire.

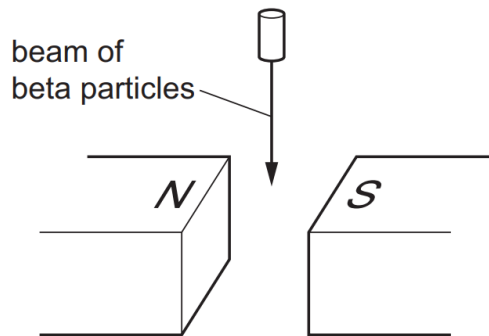


Which diagrams show possible patterns and directions for the magnetic field due to the current in the wire?

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

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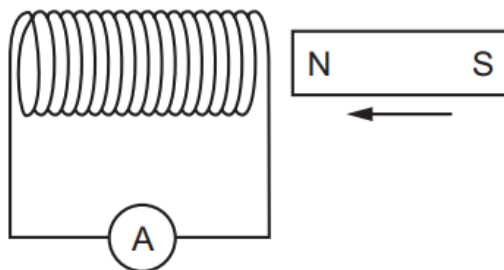
- 35** A beam of beta particles travelling vertically downwards enters the magnetic field between two magnetic poles.



The beta particles experience a force due to the magnetic field.

What is the direction of the force on a beta particle as it enters the magnetic field?

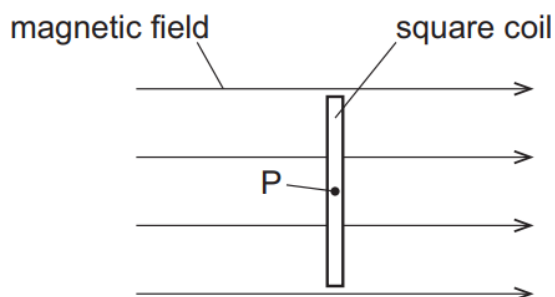
- A** towards the top of the page
 - B** towards the bottom of the page
 - C** into the page
 - D** out of the page
- 36** As a magnet is moved into the coil of wire as shown, there is a small positive reading on the sensitive ammeter.



Which change must increase the size of the reading?

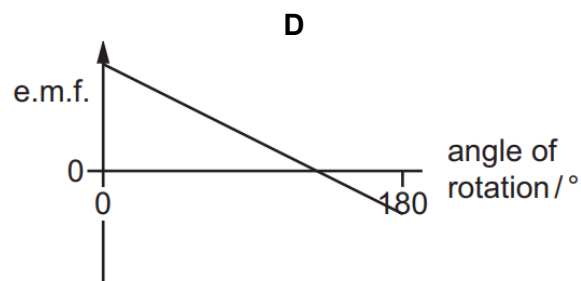
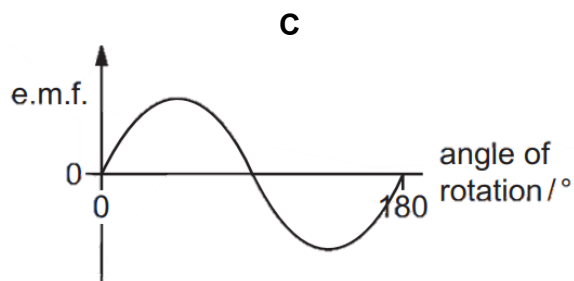
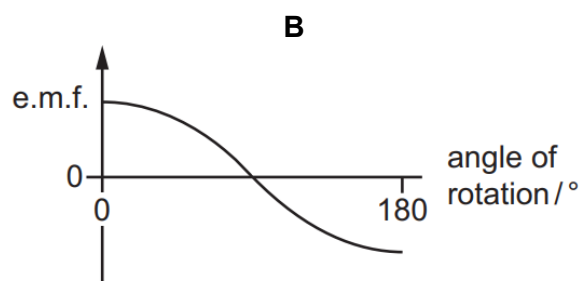
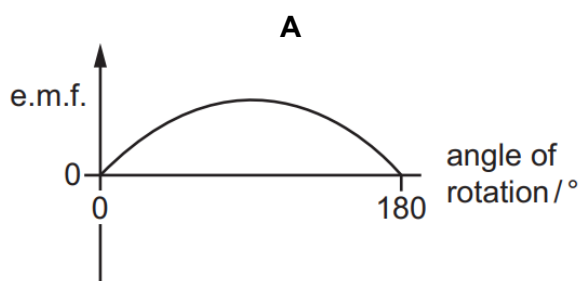
- A** moving the opposite pole into the coil
- B** pulling the magnet out of the coil
- C** pushing the magnet in faster
- D** unwinding some of the turns of wire

- 37** A square coil is placed in a horizontal uniform magnetic field. The plane of the coil is perpendicular to the magnetic field.



The coil is now rotated about an axis through P at a steady rate. The coil rotates through 180° .

Which diagram shows how the electromotive force (e.m.f.) induced in the coil varies as it rotates through 180° ?



- 38** Electrical power is transmitted by cables over long distances at very high voltages.

What are the effects of using a high voltage transmission system?

	power loss in the cables	current in the cables
A	high	high
B	high	low
C	low	high
D	low	low

[Turn over

- 39** A radioactive isotope is injected into a patient as part of a medical test. The radiation emitted is detected outside the body.

What are suitable properties for this isotope?

	radiation type	half-life
A	alpha particles	a few hours
B	beta particles	a few years
C	gamma rays	a few hours
D	gamma rays	a few years

- 40** Nuclear fusion is one source of energy.

What is nuclear fusion?

- A** the decay of a radioactive nucleus
- B** the joining together of two nuclei to make a larger nucleus
- C** the melting of an unstable nucleus
- D** the splitting of a nucleus into two lighter nuclei

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Answers

Question	Answer
1	C
2	A
3	A
4	A
5	C
6	D
7	A
8	C
9	C
10	C
11	C
12	A
13	A
14	C
15	B
16	D
17	D
18	B
19	D
20	B
21	A
22	A
23	D
24	C
25	A
26	B
27	C
28	D
29	A
30	D
31	A
32	A
33	D
34	B
35	C
36	C
37	A
38	D
39	C
40	B