Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/23**

Paper 2 Multiple Choice (Extended) **May/June 2018**

45 minutes

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB recommended)

* 9 5 6 1 1 4 4 9 5 5 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

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.

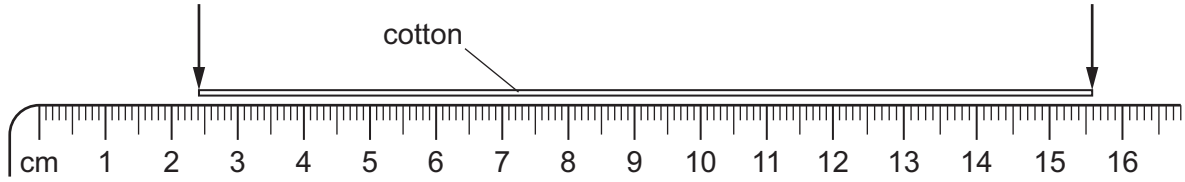
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.
Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m / s^2).

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

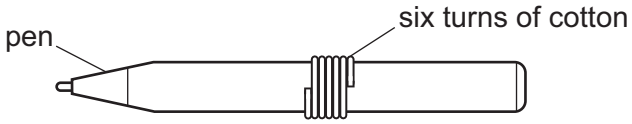
This document consists of **16** printed pages.

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1 A length of cotton is measured between two points on a ruler.



When the length of cotton is wound closely around a pen, it goes round six times.



What is the distance once round the pen?

A 2.2 cm **B** 2.6 cm **C** 13.2 cm **D** 15.6 cm

2 When does an object falling vertically through the air reach terminal velocity?

A when the acceleration of the object becomes negative

B when the acceleration of the object is equal to *g*

C when the air resistance equals the weight of the object

D when the air resistance is greater than the weight of the object

3 A sprinter runs a 100 m race in a straight line. The table shows how his speed changes with time for the first 5.0 s of the race.

$\frac{\text{speed}}{\text{m/s}}$	0	1.7	4.1	5.7	6.5	6.8
time / s	0	1.0	2.0	3.0	4.0	5.0

What is the average acceleration of the sprinter between time 2.0 s and time 3.0 s?

A 1.6 m / s^2 **B** 1.9 m / s^2 **C** 4.1 m / s^2 **D** 5.7 m / s^2

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4 A person steps onto a bathroom scales.

The bathroom scales records both mass and weight.

Which row shows the readings on the scales?

	mass	weight
A	60 N	600 kg
B	60 kg	600 N
C	600 kg	60 N
D	600 N	60 kg

5 An object has a weight of 7600 N in a gravitational field of strength 100 N / kg.

What is the mass of the object?

A 76 kg **B** 760 N **C** 7600 g **D** 76 000 N

6 A load is hung from a steel wire. The load is increased.

The length of the wire increases until the limit of proportionality is reached.

The load is now increased slightly.

What happens?

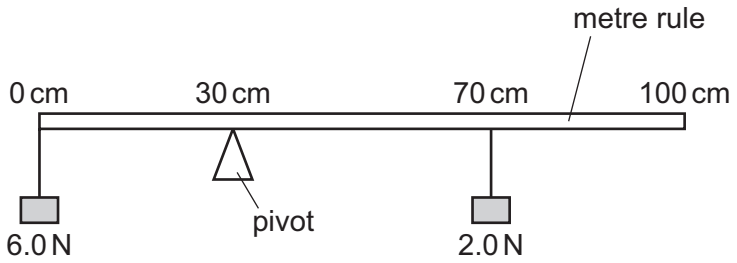
A The extension of the wire increases and the wire no longer obeys Hooke's law.

B The extension of the wire decreases and the wire no longer obeys Hooke's law.

C The extension of the wire increases and it obeys Hooke's law.

D The extension of the wire decreases and it obeys Hooke's law.

7 The diagram shows a uniform metre rule pivoted at the 30 cm mark.



The rule balances when a weight of 6.0 N is hanging from the zero mark and a weight of 2.0 N is hanging from the 70 cm mark.

What is the weight of the rule?

A 2.0 N **B** 5.0 N **C** 6.0 N **D** 13.0 N

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8 An astronaut orbits the Earth in a space station.

Which is a vector quantity?

A the mass of the astronaut

B the speed of the satellite

C the temperature inside the satellite

D the weight of the astronaut

9 A visitor to a fairground throws a soft object of mass 0.12 kg at a coconut of mass 0.48 kg. The soft object stops moving when it hits the coconut. In order to dislodge the coconut, it must be made to move at 0.10 m/s.

What is the minimum speed with which the visitor should throw the soft object in order to dislodge the coconut?

A 0.20 m/s

B 0.40 m/s

C 2.0 m/s

D 4.0 m/s

10 An aircraft with a mass of 300 000 kg is flying at an altitude of 2000 m with a speed of 100 m / s.

What is the kinetic energy of the aircraft?

A 1.5×10^4 kJ **B** 1.5×10^6 kJ **C** 3.0×10^6 kJ **D** 6.0×10^6 kJ

11 Which method of drying clothes has the least impact on the environment?

A Evaporate the water in them in an electrically heated tumble dryer.

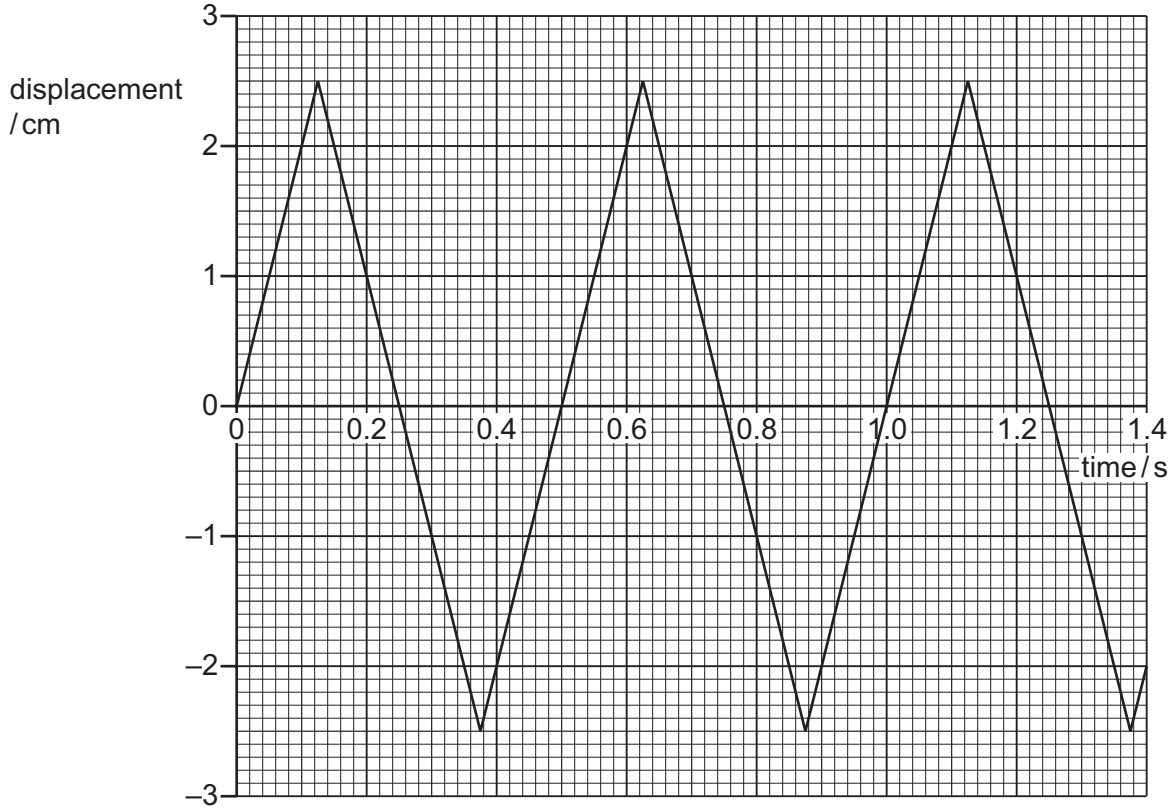
B Hang them on a washing line in direct sunlight.

C Remove the water from them in an electric spin dryer.

D Suspend them close to a coal fire.

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12 The vertical displacement of a mass of 0.20 kg changes with time. The graph shows how this displacement changes.



At which rate does it gain gravitational potential energy as it moves upwards?

A 0.025 W **B** 0.050 W **C** 0.20 W **D** 0.40 W

13 A simple barometer includes a column of mercury.

Which property of this column of mercury is used to give a measurement of atmospheric pressure?

A its cross-sectional area

B its height

C its temperature

D its thermal capacity

14 An oil tank has a base of area 2.5 m^2 and is filled with oil to a depth of 1.2 m.

The density of the oil is 800 kg / m^3.

What is the force exerted on the base of the tank due to the oil?

A 960 N **B** 2400 N **C** 9600 N **D** 24 000 N

15 When molecules of a gas rebound from a wall of a container, the wall experiences a pressure.

What is the cause of this pressure?

A the change in energy of the molecules

B the change in momentum of the molecules

C the change in power of the molecules

D the change in speed of the molecules

16 Two liquid-in-glass thermometers P and Q contain the same volume of mercury and have capillary tubes of the same length.

Thermometer P has a capillary tube with a smaller diameter than thermometer Q.

Which thermometer has the greater range and which has the greater sensitivity?

	greater range	greater sensitivity
A	P	P
B	P	Q
C	Q	P
D	Q	Q

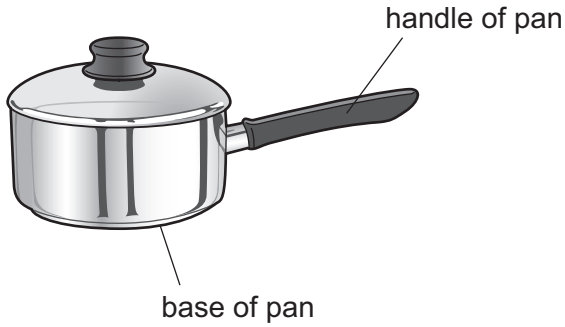
17 A student wishes to calibrate a mercury-in-glass thermometer with a °C scale.

Which values should she use for the lower fixed point and for the upper fixed point?

	lower fixed point	upper fixed point
A	melting point of ice	boiling point of mercury
B	melting point of ice	boiling point of water
C	melting point of mercury	boiling point of mercury
D	melting point of mercury	boiling point of water

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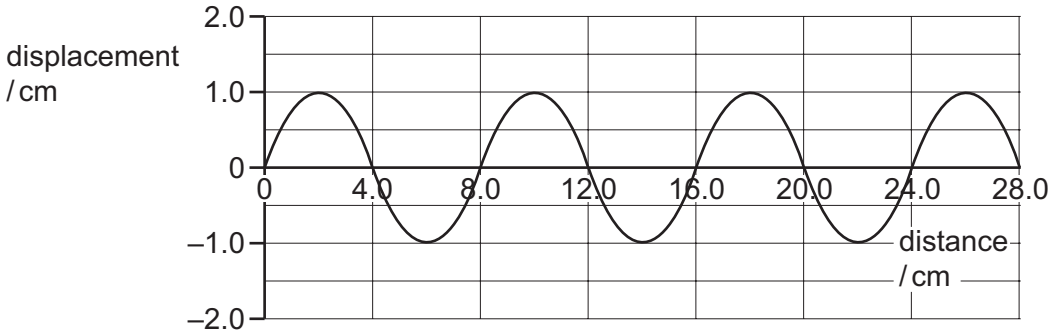
18 The diagram shows a pan used for cooking food.



Which row is correct for the materials used to make the base and the handle of the pan?

	base of pan	handle of pan
A	good thermal conductor	good thermal conductor
B	good thermal conductor	poor thermal conductor
C	poor thermal conductor	good thermal conductor
D	poor thermal conductor	poor thermal conductor

19 The diagram shows a wave.



Which row is correct?

	amplitude of the wave / cm	wavelength of the wave / cm
A	1.0	4.0
B	1.0	8.0
C	2.0	4.0
D	2.0	8.0

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20 Light travels at a speed of $2.0 \times 10^8\,\text{m/s}$ in a glass block.

In the glass, the wavelength of the light is $4.0 \times 10^{-7}\,\text{m}$.

What is the frequency of the light?

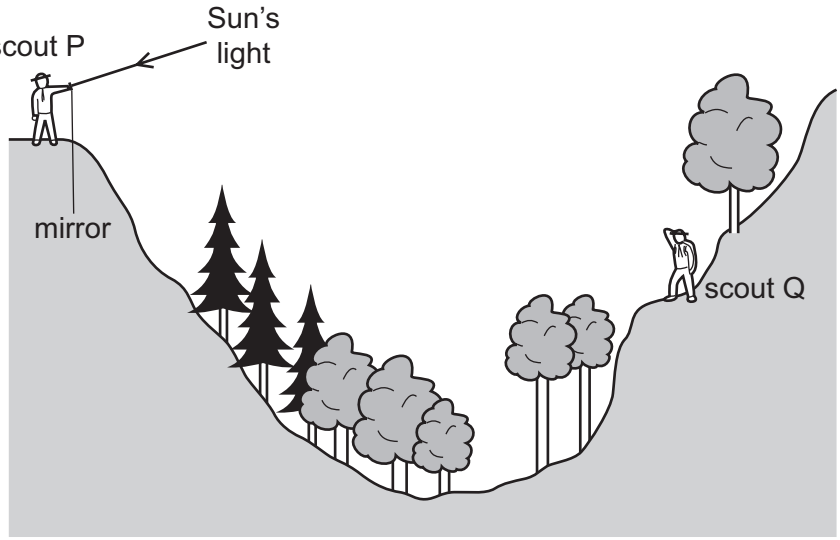
A $2.0 \times 10^{-15}\,\text{Hz}$

B $1.3 \times 10^{-2}\,\text{Hz}$

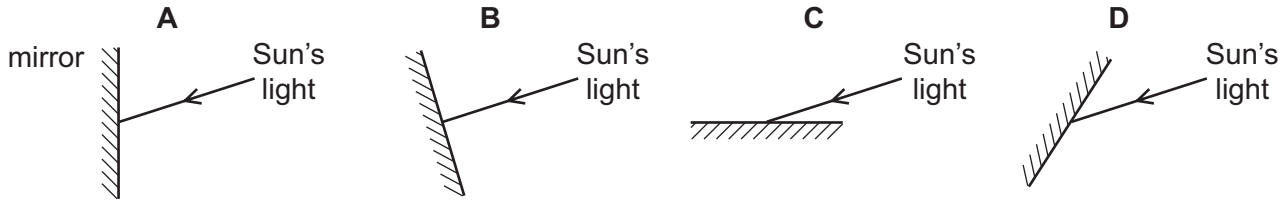
C $80\,\text{Hz}$

D $5.0 \times 10^{14}\,\text{Hz}$

21 Scout P signals to scout Q on the other side of a valley by using a mirror to reflect the Sun's light.



Which mirror position allows the Sun's light to be reflected to scout Q?

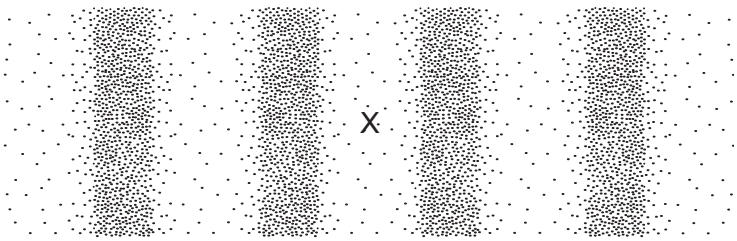


22 Images formed by lenses and mirrors can either be described as real or as virtual.

Which row describes real and virtual images of a point object?

	real images	virtual images
A	formed where light rays meet	an image in a plane mirror is an example of a virtual image
B	formed where light rays meet	can be projected onto a screen
C	formed from where light rays appear to diverge	an image in a plane mirror is an example of a virtual image
D	formed from where light rays appear to diverge	can be projected onto a screen

23 The diagram shows the air molecules in part of a sound wave at a particular moment in time.



Which statement is **not** correct?

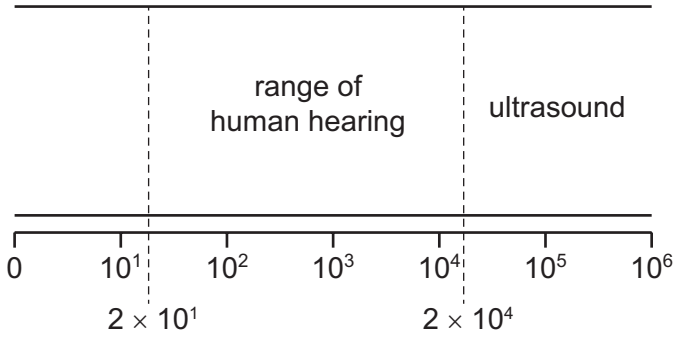
A Earlier, there was compression at X.

B Later, there will be a rarefaction at X.

C This part of the wave is travelling horizontally across the page.

D This part of the wave is travelling towards the top of the page.

24 The diagram shows the ranges of human hearing and of ultrasound waves.



To which characteristic of sound waves do the numbers on the diagram refer?

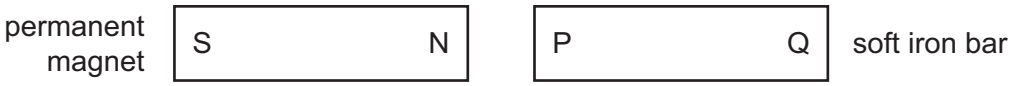
A amplitude in cm

B frequency in Hz

C speed in metres / second

D wavelength in metres

25 A permanent magnet is placed close to a bar of soft iron.



What are the polarities of end P and of end Q?

	end P	end Q
A	N	N
B	N	S
C	S	N
D	S	S

26 Which method is used to demagnetise a magnet?

A cool it in a freezer

B drop it into a beaker of water

C place it inside a coil carrying a direct current

D strike it with a hammer

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27 Two power supplies are connected in separate circuits. Both power supplies provide the same magnitude current.

Power supply P has an electromotive force (e.m.f.) of 1.5 V and power supply Q has an e.m.f. of 3.0 V.

Which statements are correct?

1 Source Q supplies twice the charge per unit time.

2 Source Q supplies twice the energy per unit charge.

3 Source Q supplies twice the energy per unit time.

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

28 A student measures the potential difference across a device and the current in the device.

Which calculation gives the resistance of the device?

A current + potential difference

B current ÷ potential difference

C potential difference ÷ current

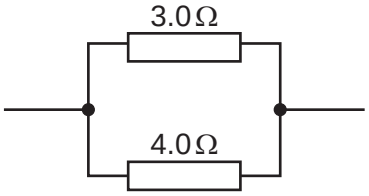
D potential difference × current

29 An electricity meter records that 200 MJ of electrical energy are drawn from the 240 V mains supply in a 24 hour period.

What is the average rate of electrical charge passing through the meter?

A 9.6 C / h **B** 580 C / h **C** 35 kC / h **D** 0.83 MC / h

30 A 3.0 Ω resistor is connected in parallel with a 4.0 Ω resistor.

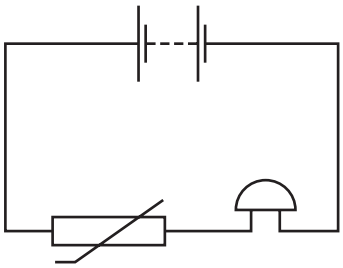


What is the resistance of this combination?

A 0.14 Ω **B** 0.58 Ω **C** 1.7 Ω **D** 7.0 Ω

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31 A student sets up this circuit.



What is the purpose of the circuit?

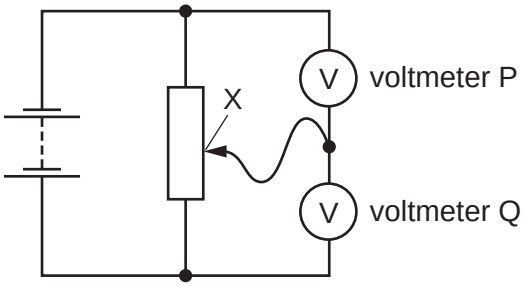
A to allow a lamp to be made dimmer or brighter as required

B to amplify the sound of a voice

C to light a lamp in the dark

D to sound a bell when the temperature rises

32 The diagram shows two voltmeters P and Q connected to a potential divider.



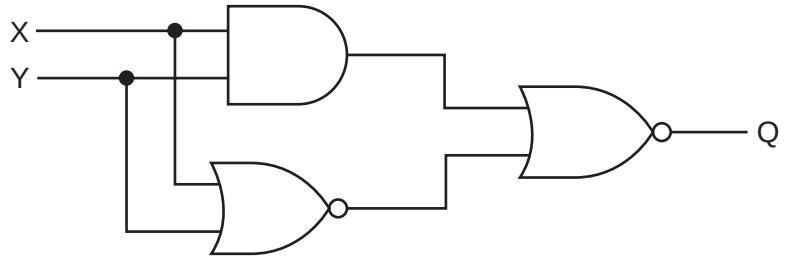
The sliding connection at point X is moved towards the top of the diagram.

What happens to the reading on P and to the reading on Q?

	reading on P	reading on Q
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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33 The diagram shows a logic circuit with inputs X and Y.



The output is Q.

Which truth table is correct?

A

X	Y	Q
0	0	0
0	1	1
1	0	1
1	1	0

B

X	Y	Q
0	0	1
0	1	0
1	0	0
1	1	1

C

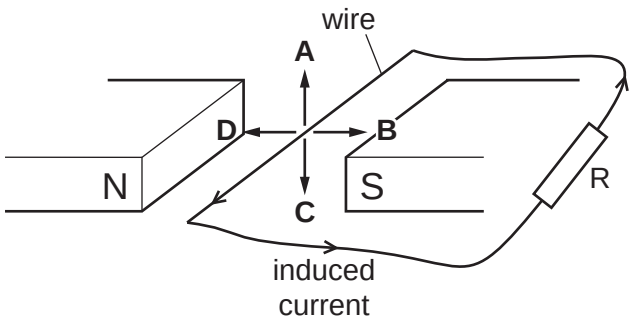
X	Y	Q
0	0	1
0	1	1
1	0	1
1	1	1

D

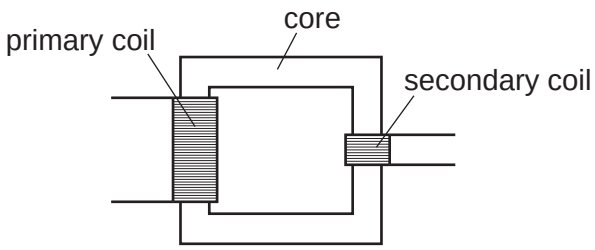
X	Y	Q
0	0	0
0	1	0
1	0	0
1	1	0

34 A wire connected to a resistor is moved in a magnetic field. A current is induced in the direction shown.

In which direction is the wire moved?



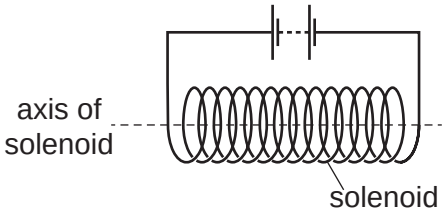
35 The diagram shows a transformer.



Which materials are the most suitable for the core and for the coils?

	core material	coil material
A	copper	copper
B	copper	iron
C	iron	copper
D	iron	iron

36 A solenoid is connected to a battery.



Which statement about the magnetic field at the centre of the solenoid is correct?

A The magnetic field along the axis is zero.

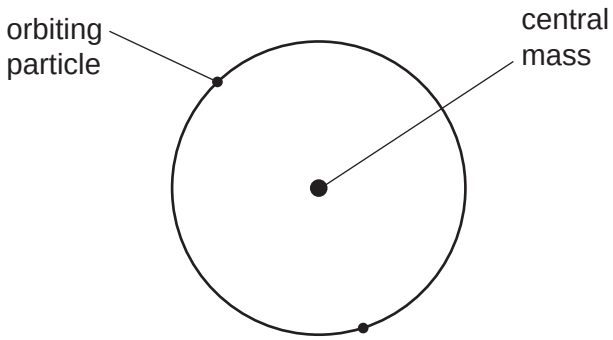
B The direction of the magnetic field is at an angle of 45° to the axis.

C The direction of the magnetic field is parallel to the axis.

D The direction of the magnetic field is perpendicular to the axis.

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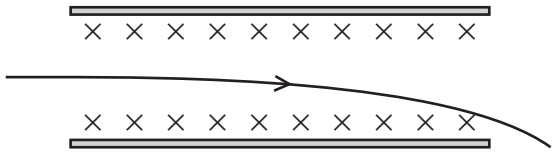
37 In the atomic model, an atom consists of a central mass, orbited by much smaller particles.



What is the name of the central mass and of the orbiting particles?

	central mass	orbiting particles
A	neutron	α-particles
B	neutron	electrons
C	nucleus	α-particles
D	nucleus	electrons

38 The radiation from a radioactive source passes between two metal plates, and is deflected as shown in the diagram. Between the plates there is a magnetic field directed into the plane of the paper, as indicated by the crosses.



Only one type of radiation is present.

Which situation is possible?

A The source emits alpha particles and there is an upwards electric field between the plates.

B The source emits alpha particles and there is no electric field between the plates.

C The source emits beta particles and there is an upwards electric field between the plates.

D The source emits gamma radiation and there is a downwards electric field between the plates.

39 The nucleus of an isotope of nitrogen (N) absorbs a neutron. It then decays into an isotope of carbon (C) and emits x.

$$^{1}_{0}n + {}^{14}_{7}N \rightarrow {}^{14}_{6}C + x$$

What is x?

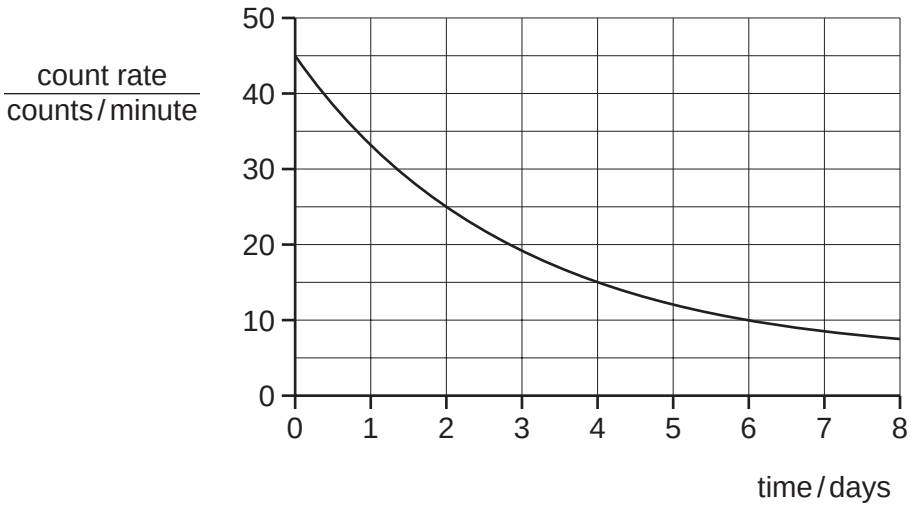
A α-particle

B β-particle

C γ-radiation

D proton

40 The graph shows how the count rate registered by a counter near to a sample of a radioactive isotope changes over a period of a few days. The background count rate is 5 counts per minute.



What is the half-life of the isotope?

A 2.0 days **B** 2.5 days **C** 3.0 days **D** 4.0 days

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