Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/21**

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)

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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.

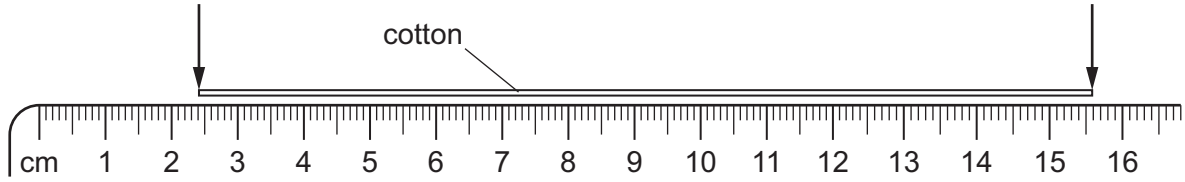
Read the instructions on the Answer Sheet very carefully.

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).

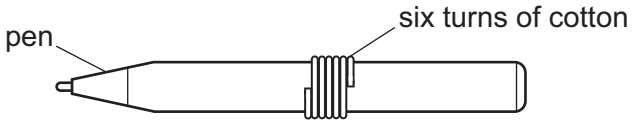
The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

IB18 06_0625_21/3RP
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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

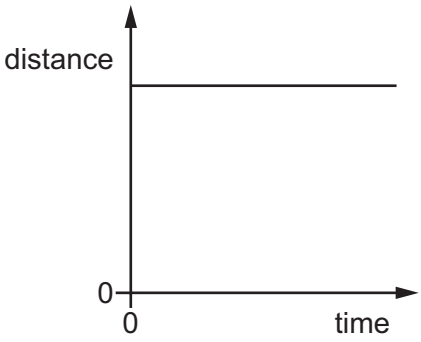
D when the air resistance is greater than the weight of the object

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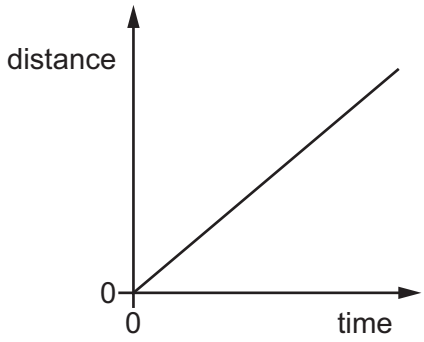
3 A car is moving along a straight, level road, with a constant acceleration.

Which graph shows the motion of the car?

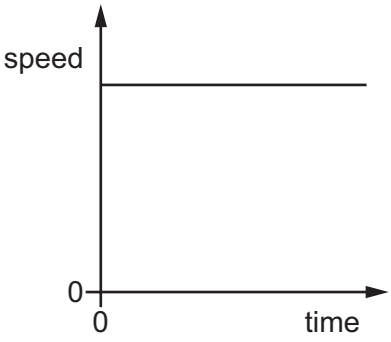
A



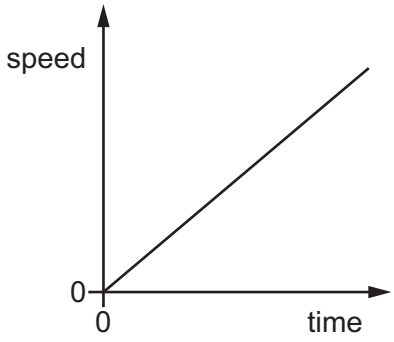
B



C

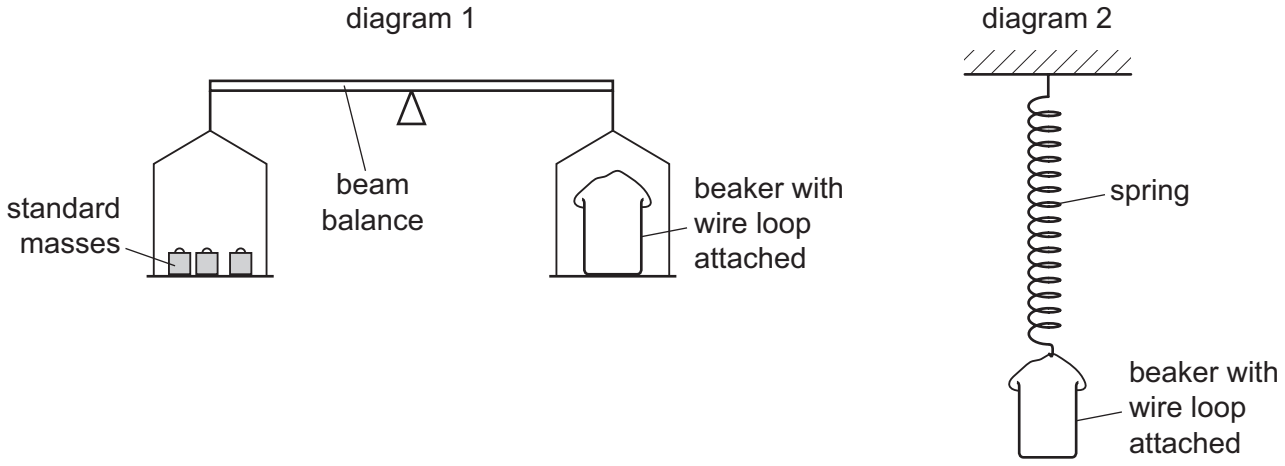


D



4 Diagram 1 shows a beam balance. A beaker with a wire loop balances the standard masses.

The beaker is then removed and hung from a spring. The spring extends by 5.0 cm, as in diagram 2.



The experiment is repeated with the same apparatus on the Moon, where the acceleration of free fall is less than on Earth.

Which statement describes what happens on the Moon?

A The beam balance is balanced and the spring extends by 5.0 cm.

B The beam balance is balanced and the spring extends by less than 5.0 cm.

C The right-hand balance pan is higher and the spring extends by 5.0 cm.

D The right-hand balance pan is higher and the spring extends by less than 5.0 cm.

5 An object always has mass but does not always have weight.

What must be present and acting on the mass for it to have weight?

A a gravitational field

B a set of scales

C displaced water

D friction due to air resistance

6 A force acting on a moving ball causes its motion to change. This force stays constant.

What makes the force produce a greater change in the motion of the ball?

A decreasing the total mass of the ball

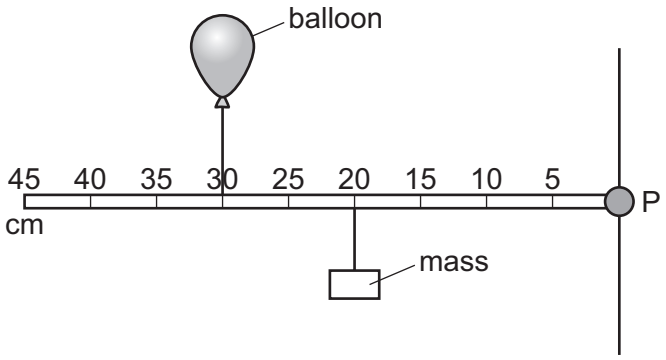
B increasing the temperature of the ball

C using a ball with a hollow centre but the same mass

D using a different material for the ball so that it has a lower density but the same mass

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7 A balloon and a mass are attached to a rod that is pivoted at P.



The balloon is filled with helium, a gas less dense than air, so that it applies an upward force on the rod.

The rod is horizontal and stationary.

Which action causes the rod to rotate clockwise?

A Move both the balloon and mass 10 cm to the left.

B Move both the balloon and mass 10 cm to the right.

C Move both the balloon and mass to the 25 cm mark.

D Move the balloon to the 20 cm mark and the mass to the 30 cm mark.

8 A car is moving in a straight line on a level road. Its engine provides a forward force on the car. A second force of equal size acts on the car due to resistive forces.

Which statement describes what happens?

A The car changes direction.

B The car moves at a constant speed.

C The car slows down.

D The car speeds up.

9 Which expression gives the momentum of an object?

A mass × acceleration

B mass × gravitational field strength

C mass × velocity

D $\frac{1}{2}$ × mass × (velocity)^2

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[Turn over

10 As energy is transferred into different forms, it eventually becomes dissipated.

What does this mean?

A All the energy disappears.

B The energy finally changes into every possible form of energy.

C The energy spreads out among the objects and their surroundings.

D The total amount of energy becomes less.

11 A ball of mass 1.2 kg is dropped from a height of 30 m. As it falls, 25% of its initial gravitational potential energy is transferred to thermal energy.

What is the kinetic energy of the ball just before it hits the ground?

A 27 J **B** 90 J **C** 270 J **D** 360 J

12 A girl hangs by her hands from a bar in the gymnasium. She pulls herself up until her chin is level with the bar.

The mass of the girl is 48 kg.

She pulls herself up through a distance of 0.25 m.

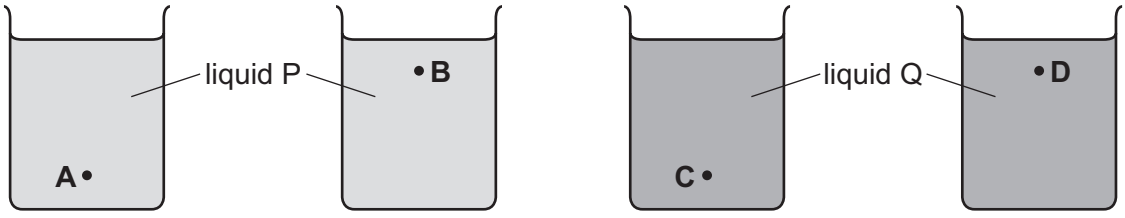
She does this in 2.0 s.

What is the useful power she uses to pull herself up?

A 6.0 W **B** 24 W **C** 60 W **D** 240 W

13 Four identical beakers are filled with equal volumes of liquids P or Q, as shown. Liquid P is more dense than liquid Q.

At which point is the pressure the least?



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

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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 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

17 Which statements about boiling and about evaporation are both correct?

	boiling	evaporation
A	takes place only at the surface	takes place only at the surface
B	takes place only at the surface	takes place throughout the liquid
C	takes place throughout the liquid	takes place only at the surface
D	takes place throughout the liquid	takes place throughout the liquid

18 On a cold day, a metal front-door knob X and a similar plastic knob Y are at the same temperature.

Why does X feel cooler to the touch than Y?

A X convects thermal energy better than Y.

B X is a better thermal conductor than Y.

C X is a better insulator than Y.

D X is a better radiator of thermal energy than Y.

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19 Light travels at a speed of 2.0×10^8 m/s in a glass block.

In the glass, the wavelength of the light is 4.0×10^{-7} m.

What is the frequency of the light?

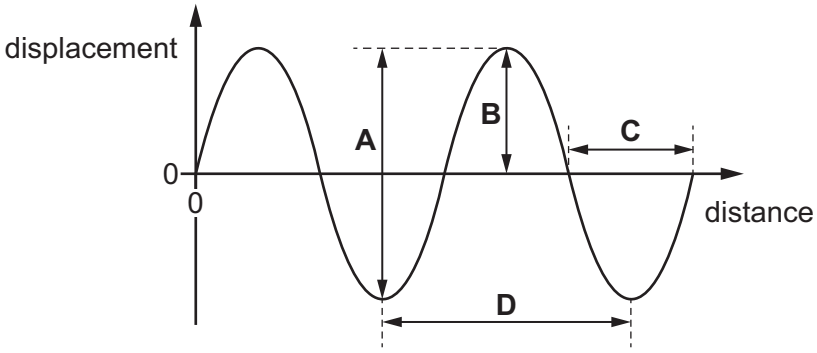
A 2.0×10^{-15} Hz

B 1.3×10^{-2} Hz

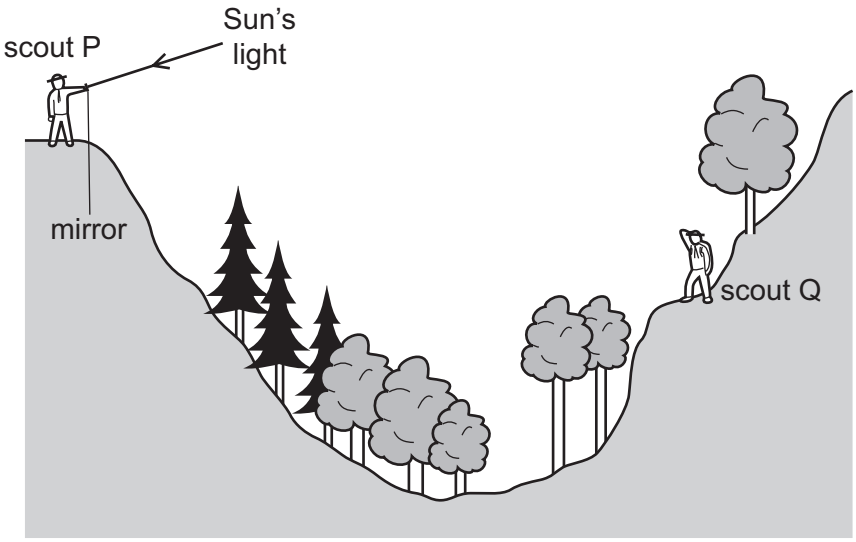
C 80 Hz

D 5.0×10^{14} Hz

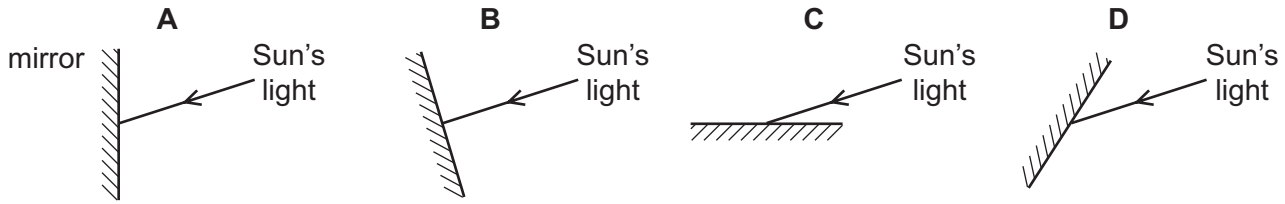
20 Which arrow on the graph shows the amplitude of the wave?



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

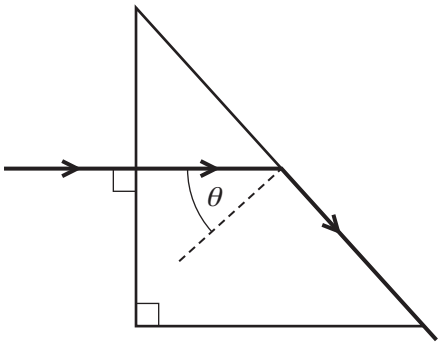


Which mirror position allows the Sun's light to be reflected to scout Q?



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22 A prism is made from transparent plastic. In this plastic, light travels at 0.80 *c*, where *c* is its speed in air. Light enters one face of the prism at right-angles as shown.



NOT TO SCALE

The light just escapes from the sloping face of the prism.

What is angle θ?

A 37° **B** 39° **C** 51° **D** 53°

23 The Sun emits infra-red radiation and light.

Light from the Sun reaches the Earth in 8 minutes.

Which row gives correct information about the infra-red radiation?

	wavelength of infra-red radiation	time taken for infra-red radiation to reach Earth
A	longer than wavelength of light	8 minutes
B	longer than wavelength of light	much less than 8 minutes
C	shorter than wavelength of light	8 minutes
D	shorter than wavelength of light	much more than 8 minutes

24 A dolphin has a range of audible frequencies of 150 Hz–150 kHz.

Which range of frequencies can be heard both by humans with good hearing and by dolphins?

A 20 Hz–150 Hz

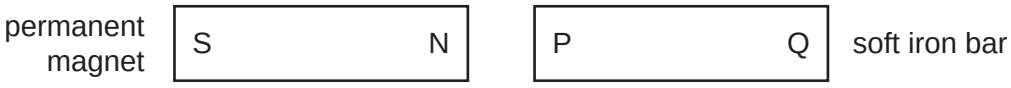
B 20 Hz–150 kHz

C 20 kHz–150 kHz

D 150 Hz–20 kHz

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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 A steel magnet is placed inside a coil of wire.

Which method is used to demagnetise the magnet?

A connect the coil to an a.c. power supply

B connect the coil to an a.c. power supply and slowly remove the magnet from the coil

C connect the coil to a d.c. power supply

D connect the coil to a d.c. power supply and slowly remove the magnet from the coil

27 The electromotive force (e.m.f.) of a rechargeable battery is 6.0 V.

What does this mean?

A 6.0 J is the maximum energy the battery can provide in 1.0 s.

B 6.0 J is the total energy the battery can provide before it has to be recharged.

C 6.0 J of energy is provided by the battery to drive a charge of 1.0 C around a complete circuit.

D 6.0 J of energy is provided by the battery to drive a current of 1.0 A around a complete circuit.

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

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29 A water heater is connected to a 230 V supply and there is a current of 26 A in the heater. It takes 20 minutes to heat the water to the required temperature.

How much energy is supplied by the heater?

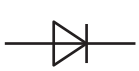
A 6.0×10^3 J **B** 1.0×10^4 J **C** 1.2×10^5 J **D** 7.2×10^6 J

30 Which electrical symbol represents a diode?

A



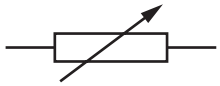
B



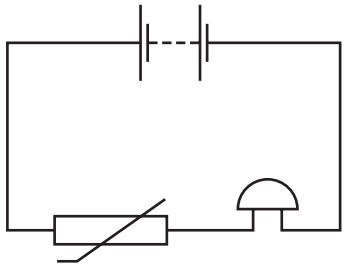
C



D



31 A student sets up this circuit.



What is the purpose of the circuit?

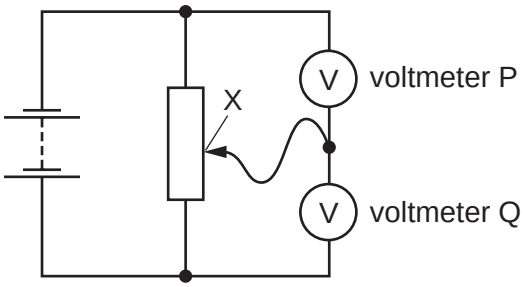
A to allow a lamp to be made dimmer or brighter as required

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.

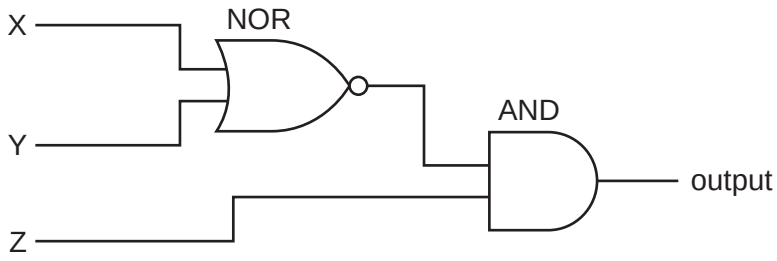


The sliding connection at point X is moved towards the top of the diagram.

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

33 The diagram represents a digital circuit using a NOR gate and an AND gate.



What is the truth table for this circuit?

A

X	Y	Z	output
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

B

X	Y	Z	output
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

C

X	Y	Z	output
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

D

X	Y	Z	output
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

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34 Which statement about electromagnetic induction is correct?

A A strong magnet that is held stationary near a stationary conductor causes a greater effect than a weak magnet.

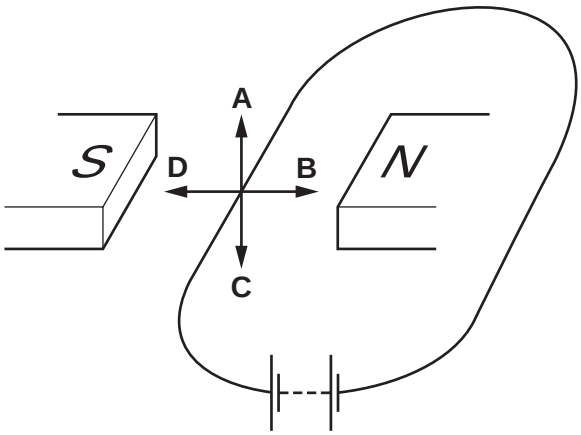
B The effect occurs when a magnet and a conductor are both moved with the same speed and in the same direction.

C The effect occurs when a magnet is moved away from a nearby conductor.

D The effect only occurs when a magnet is moved towards a conductor.

35 The diagram shows a current-carrying conductor in a magnetic field.

Which arrow shows the direction of the force acting on the conductor?



36 Power losses in transmission cables are reduced by increasing the transmission voltage.

What is the explanation for this reduction?

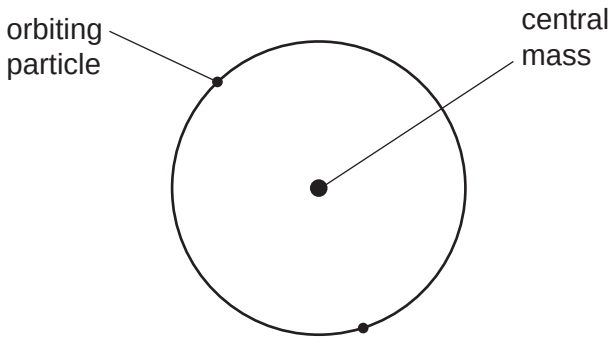
A The current decreases, reducing thermal energy losses.

B The current increases, increasing the flow of charge.

C The resistance of the cable increases, reducing the current.

D The resistance of the cable decreases.

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

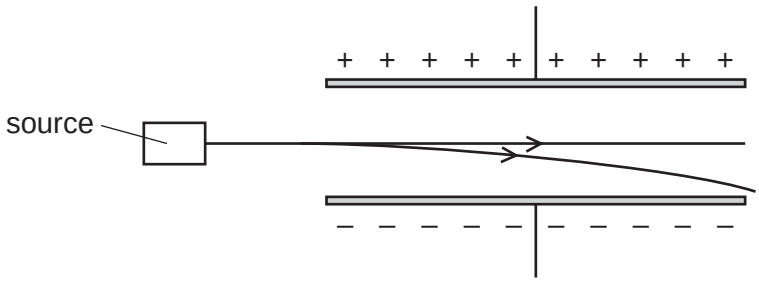
38 Nuclear fusion is a reaction that takes place in stars.

Which row describes this reaction?

	action of atomic nuclei	energy
A	an atomic nucleus splits into two or more smaller nuclei	absorbed
B	an atomic nucleus splits into two or more smaller nuclei	released
C	atomic nuclei join together to form a larger nucleus	absorbed
D	atomic nuclei join together to form a larger nucleus	released

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39 The diagram shows emissions from a source passing into the electric field between two charged plates.



What is emitted by this source?

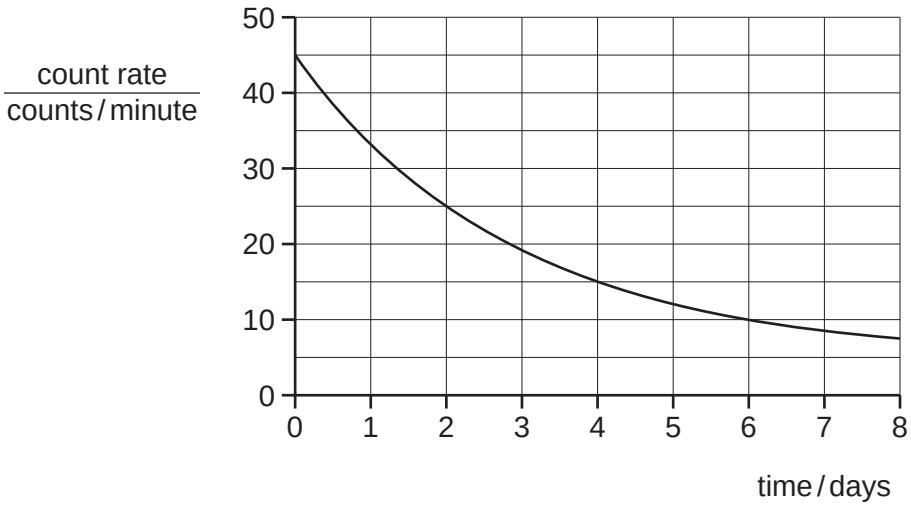
A neutrons and γ-rays only

B α-particles and β-particles only

C α-particles and γ-rays only

D β-particles and γ-rays only

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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