Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/23**

Paper 2 Multiple Choice (Extended) **May/June 2019**

45 minutes

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

7151954492

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).

This syllabus is regulated 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 Which quantity can be measured directly using a micrometer screw gauge?

A the area of a sheet of paper

B the mass of a sheet of paper

C the thickness of a sheet of paper

D the volume of a sheet of paper

2 A brass ball and a feather are released at the same time.

On Earth, the ball reaches the ground first.

On the Moon, they reach the ground at the same time.

What is the explanation for this?

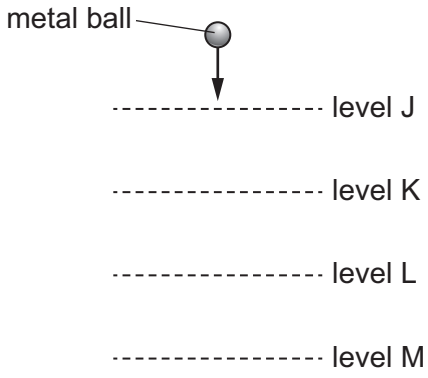
A Both weigh the same on the Moon.

B Both weigh less on the Moon.

C There is a greater air resistance on the Moon.

D There is no air resistance on the Moon.

3 A heavy metal ball falls vertically downwards through air past four equally spaced levels J, K, L and M.



The times taken to fall from one level to the next are measured.

Where is the speed of the ball greatest and which time is shortest?

	speed is greatest between	time is shortest between
A	J and K	J and K
B	J and K	L and M
C	L and M	J and K
D	L and M	L and M

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4 On Earth, a spring stretches by 5.0 cm when a mass of 3.0 kg is suspended from one end.

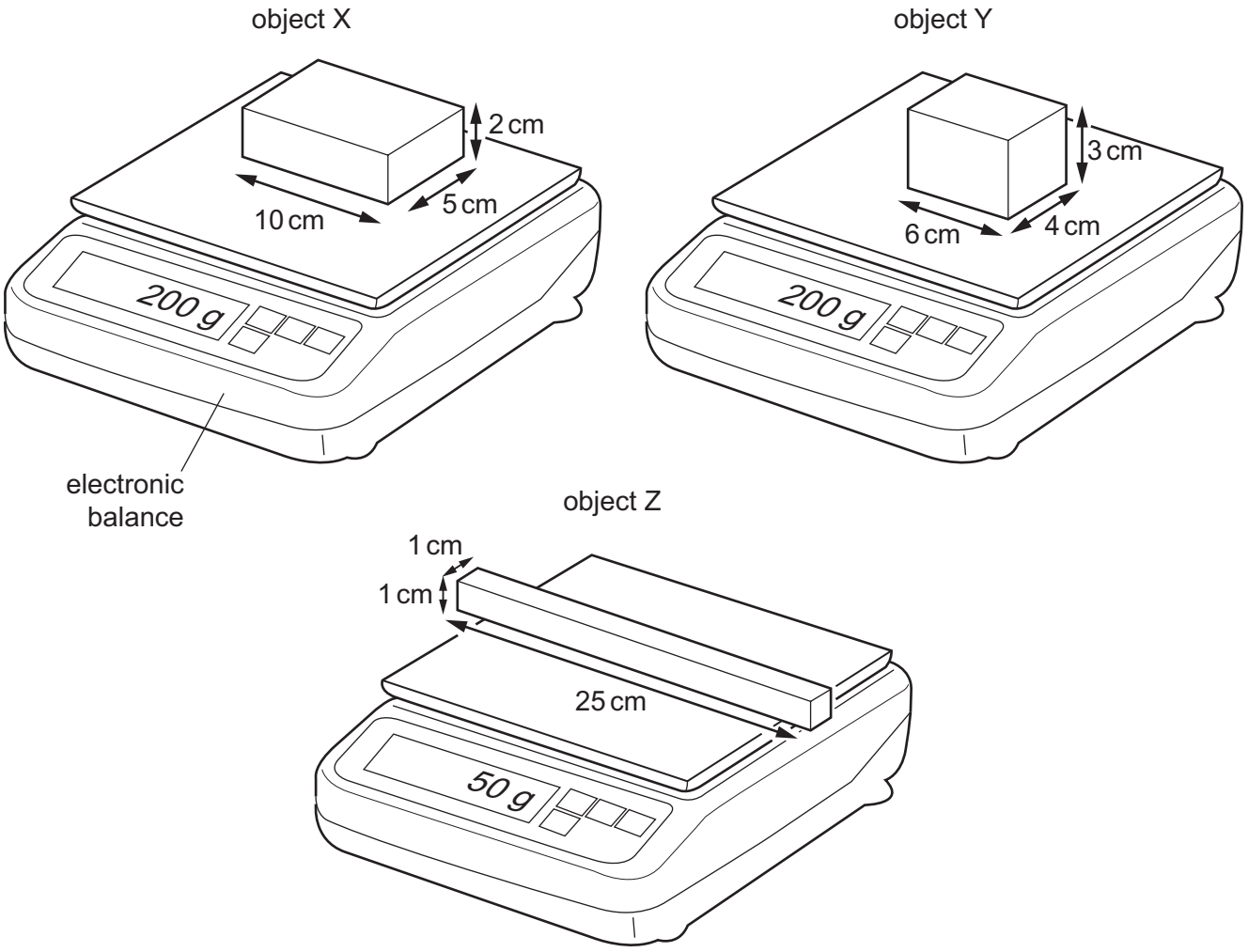
The gravitational field strength on the Moon is $\frac{1}{6}$ of that on Earth.

Which mass, on the Moon, would stretch the spring by the same extension?

A 0.50 kg **B** 3.0 kg **C** 5.0 kg **D** 18 kg

5 X, Y and Z are three regularly shaped solid objects.

Their dimensions and masses are shown in the diagrams.



Which objects have the same density?

A X, Y and Z **B** X and Y only **C** X and Z only **D** Y and Z only

6 An experiment is carried out to determine the spring constant for a spring that obeys Hooke's law.

A load is hung from the spring and the extension of the spring is measured.

Which calculation is used to calculate the spring constant?

A $\frac{\text{extension}}{\text{mass of the load}}$

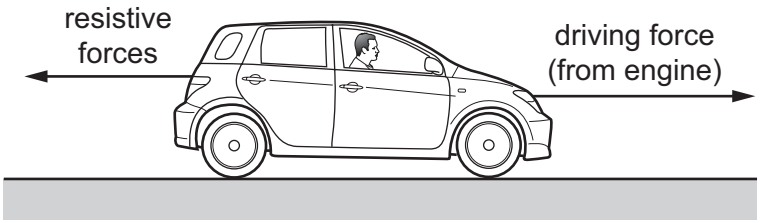
B $\frac{\text{extension}}{\text{weight of the load}}$

C $\frac{\text{mass of the load}}{\text{extension}}$

D $\frac{\text{weight of the load}}{\text{extension}}$

7 A car is driven from rest on a long straight road. The car engine exerts a constant driving force.

The diagram shows the horizontal forces acting on the car. The resistive forces are proportional to the speed of the car.



Why does the car eventually reach a maximum speed?

A The resistive forces decrease to make the acceleration of the car negative.

B The resistive forces decrease to make the acceleration of the car zero.

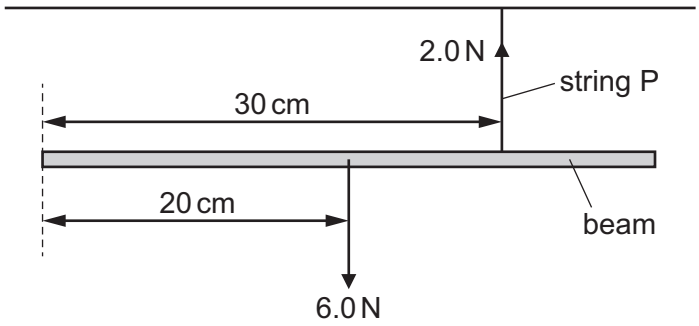
C The resistive forces increase to make the acceleration of the car negative.

D The resistive forces increase to make the acceleration of the car zero.

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8 A beam of weight 6.0 N is suspended from two strings P and Q.

String P is 30 cm from the left-hand end of the beam, as shown. String Q is not shown.



The tension in string P is 2.0 N.

What is the tension in string Q and where is it attached so that the beam is in equilibrium?

A 4.0 N at 10.0 cm from the left-hand end

B 4.0 N at 15.0 cm from the left-hand end

C 6.0 N at 10.0 cm from the left-hand end

D 8.0 N at 7.5 cm from the left-hand end

9 How is momentum p calculated in terms of the mass m of a body and its velocity v, and what type of quantity is p?

	equation	type of quantity
A	$p = m \times v$	scalar
B	$p = m \times v$	vector
C	$p = \frac{m}{v}$	scalar
D	$p = \frac{m}{v}$	vector

10 An object is in free fall. The change in gravitational potential energy of the body depends upon its mass m, the change in height Δh and the gravitational field strength g.

What is the correct expression for the change in gravitational potential energy?

A $gm\Delta h$ **B** $\frac{gm}{\Delta h}$ **C** $\frac{g\Delta h}{m}$ **D** $\frac{m\Delta h}{g}$

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11 A machine is very efficient.

What does this mean?

A It produces a large amount of power.

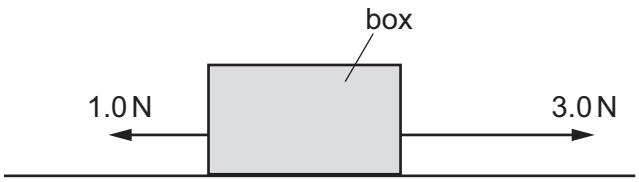
B It uses very little energy.

C It wastes very little energy.

D It works very quickly.

12 A box is pulled along a floor by a force of 3.0 N.

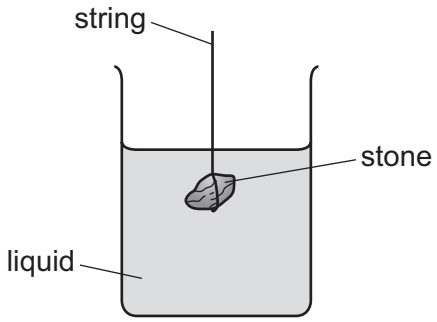
The friction acting on the box is 1.0 N, as shown.



How much kinetic energy does the box gain in moving 2.0 m?

A 2.0 J **B** 4.0 J **C** 6.0 J **D** 8.0 J

13 The diagram shows a stone suspended on a string under the surface of a liquid. The stone experiences a pressure caused by the liquid.



What would increase the pressure on the stone?

A decreasing the surface area of the stone

B increasing the mass of the stone

C lowering the stone deeper into the liquid

D using a liquid with a lower density

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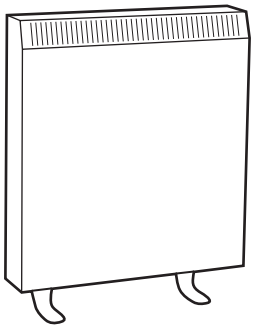
14 Water in a beaker evaporates when it is left on a bench for a period of time.

Increasing the surface area and increasing the temperature of the water each change the rate of evaporation.

Which row is correct?

	increasing the surface area	increasing the temperature
A	rate of evaporation decreases	rate of evaporation decreases
B	rate of evaporation decreases	rate of evaporation increases
C	rate of evaporation increases	rate of evaporation decreases
D	rate of evaporation increases	rate of evaporation increases

15 A night storage heater contains a large block of material that is heated electrically during the night. During the day the block cools down, releasing thermal energy into the room.



Which thermal capacity and which night-time temperature increase will cause the most energy to be stored by the block?

	thermal capacity of block	night-time temperature increase
A	large	large
B	large	small
C	small	large
D	small	small

16 100 g of water at 25 °C is poured into an insulating cup. 50 g of ice at 0 °C is added to the water. The water is stirred until the temperature of the water has fallen to 0 °C.

18 g of ice remains unmelted.

The specific heat capacity of water is 4.2 J / g °C.

Which value does this experiment give for the specific latent heat of fusion of ice?

A 210 J / g **B** 330 J / g **C** 580 J / g **D** 770 J / g

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17 Why does a metal rod conduct thermal energy much better than a similar-sized plastic rod?

A The molecules in the plastic are much closer together than the atoms in the metal.

B The molecules in the plastic are much larger than the atoms in the metal.

C The molecules in the plastic are much more tightly held together than the atoms in the metal.

D The molecular structure in the plastic contains no free electrons, but the metal has free electrons.

18 The metal surface of a kettle is hot.

What happens to the cool air outside the kettle when it comes into contact with the hot kettle?

A The density of the air decreases and the air falls.

B The density of the air decreases and the air rises.

C The density of the air increases and the air falls.

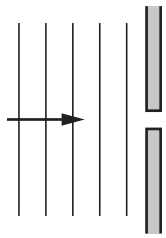
D The density of the air increases and the air rises.

19 When water waves pass through a gap they diffract.

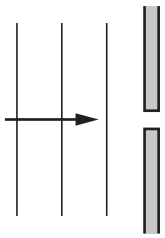
The diagrams show wavefronts approaching a narrow gap.

In which diagram will the diffraction be least?

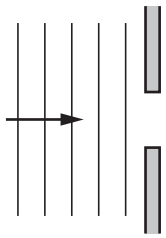
A



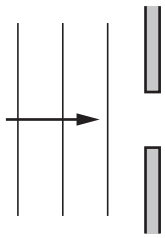
B



C



D



20 Sound travels through air at a speed of 340 m / s. A source generates sound waves at a frequency of 1.2 kHz.

What is the wavelength of the sound waves?

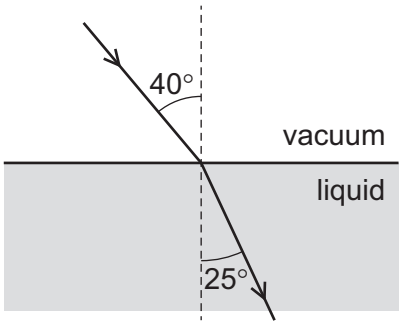
A 0.28 m **B** 3.5 m **C** 280 m **D** 410 m

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21 Which conditions are necessary for light to be totally internally reflected?

	the incident light is in	angle of incidence
A	the less dense medium	less than the critical angle
B	the less dense medium	greater than the critical angle
C	the more dense medium	less than the critical angle
D	the more dense medium	greater than the critical angle

22 A beam of light passes through a vacuum and then enters a liquid. The diagram shows the path it takes.



The light travels through the vacuum at a speed of $3.0 \times 10^8\,\text{m/s}$.

What is the speed of light in the liquid?

A $1.9 \times 10^8\,\text{m/s}$

B $2.0 \times 10^8\,\text{m/s}$

C $4.6 \times 10^8\,\text{m/s}$

D $4.8 \times 10^8\,\text{m/s}$

23 An eclipse of the Sun happens when the Moon comes between the Earth and the Sun.

Which statement is correct?

A Infra-red radiation from the Sun disappears before visible light and ultra-violet radiation.

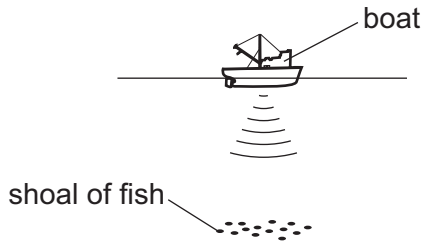
B Ultra-violet radiation from the Sun disappears before visible light and infra-red radiation.

C Visible light from the Sun disappears before ultra-violet radiation and infra-red radiation.

D Infra-red radiation, ultra-violet radiation and visible light from the Sun all disappear at the same moment.

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24 A pulse of sound is produced at the bottom of a boat. The sound travels through the water and is reflected from a shoal of fish. The sound reaches the boat again after 1.2 s. The speed of sound in the water is 1500 m / s.



How far below the bottom of the boat is the shoal of fish?

A 450 m **B** 900 m **C** 1800 m **D** 3600 m

25 Which statement about ultrasound is correct?

A It has a higher frequency than audible sound, and it is a longitudinal wave.

B It has a higher frequency than audible sound, and it is a transverse wave.

C It has a lower frequency than audible sound, and it is a longitudinal wave.

D It has a lower frequency than audible sound, and it is a transverse wave.

26 A metal bar is placed inside a current-carrying coil, as shown in diagram 1.

There is a small current in the coil. The bar holds a few nails, as shown in diagram 2.

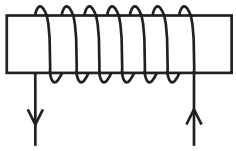


diagram 1

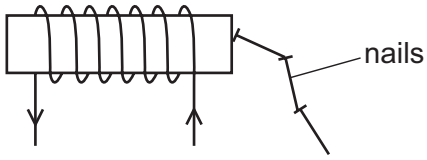


diagram 2

When there is no current in the coil, the nails drop off.

Which row is correct?

	metal from which the bar is made	effect of a larger current in the coil
A	soft iron	it makes no difference
B	soft iron	the bar holds more nails
C	steel	it makes no difference
D	steel	the bar holds more nails

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27 Diagram 1 shows two thin, uncharged strips of plastic.

Diagram 2 shows the same strips after they have been rubbed with a dry cloth.

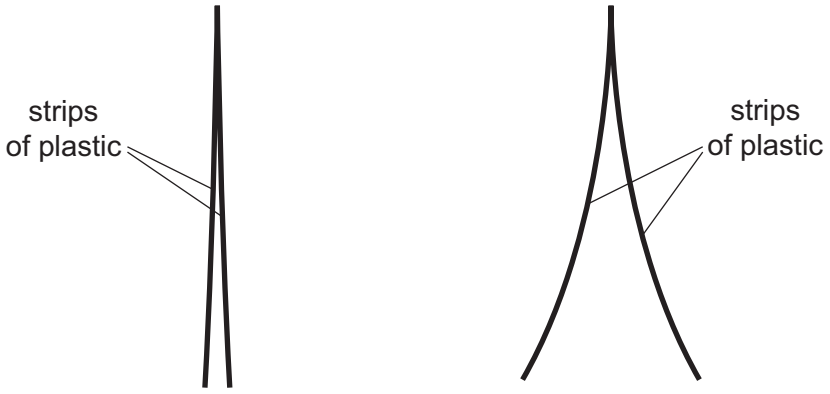


diagram 1 diagram 2

Which row describes the charge on the strips after rubbing, and the force between the strips after rubbing?

	charge on strips	force between strips
A	opposite	attraction
B	opposite	repulsion
C	the same	attraction
D	the same	repulsion

28 A cell has an electromotive force (e.m.f.) of 1.5 V.

What does this statement mean?

A The cell converts 1.0 J of energy when driving 1.5 C of charge round a complete circuit.

B The cell converts 1.5 J of energy when driving 1.0 C of charge round a complete circuit.

C The cell converts 1.5 J of energy per second when driving 1.0 C of charge round a complete circuit.

D The cell converts 1.5 W of power when driving 1.0 C of charge round a complete circuit.

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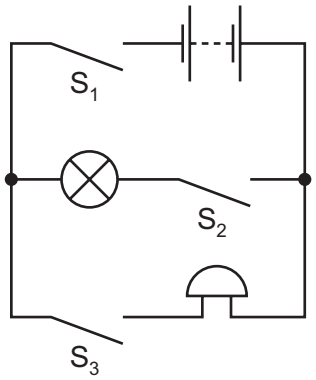
29 Two wires X and Y are made from the same metal and have the same resistance.

Which row identifies a possible pair of values for X and for Y?

	length of X / cm	diameter of X / mm	length of Y / cm	diameter of Y / mm
A	50	0.40	200	0.10
B	50	0.40	200	0.20
C	50	0.40	200	0.80
D	50	0.40	200	1.60

30 The diagram shows a circuit including a lamp, an electric bell and three switches S_1, S_2 and S_3.

The lamp and bell are not faulty.



The bell is ringing but the lamp is not lit.

Which switches are closed?

A S_1 only

B S_1 and S_2 only

C S_1 and S_3 only

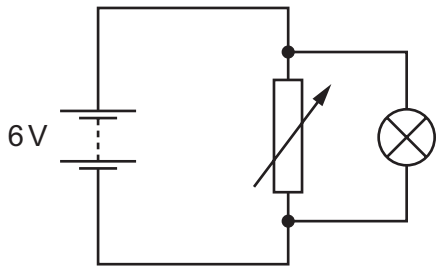
D S_1, S_2 and S_3

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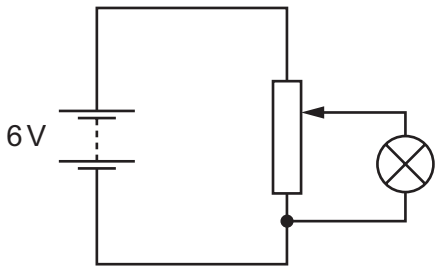
31 A lamp is to be connected in a circuit so that the potential difference (p.d.) across it can be varied from 0 to 6 V.

Which circuit would be most suitable?

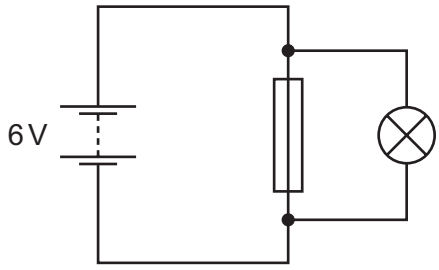
A



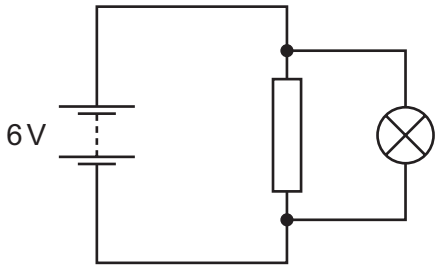
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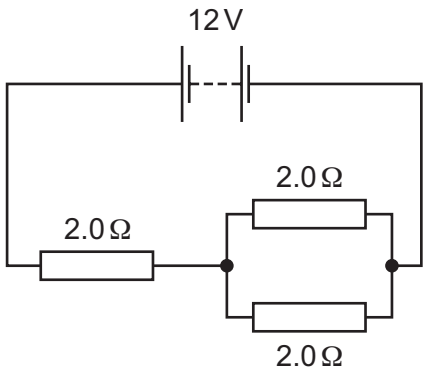
C



D



32 A 12 V battery is connected to a combination of 2.0 Ω resistors as shown.



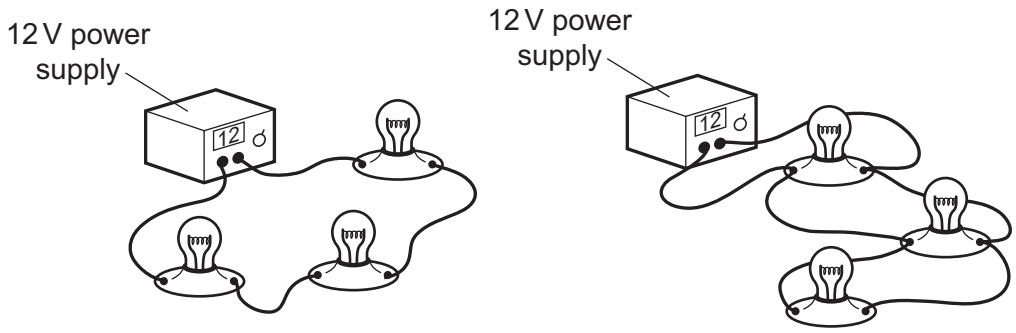
What is the current in the battery?

A 1.5 A **B** 2.0 A **C** 4.0 A **D** 6.0 A

33 A student is designing a lighting circuit for a dolls' house. He sets up two different circuits.

Each circuit contains a 12 V power supply and three identical lamps.

Each lamp is designed to operate at normal brightness when connected individually to a 12 V supply.



circuit 1 circuit 2

Which statement is correct?

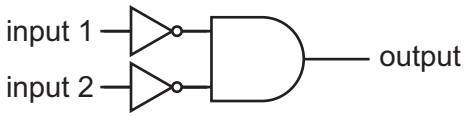
A In circuit 1, each of the lamps is at normal brightness.

B In circuit 1, if one lamp fails, the other lamps remain lit.

C In circuit 2, if one lamp fails, the other lamps remain lit.

D In circuit 2, the current from the power supply is less than in circuit 1.

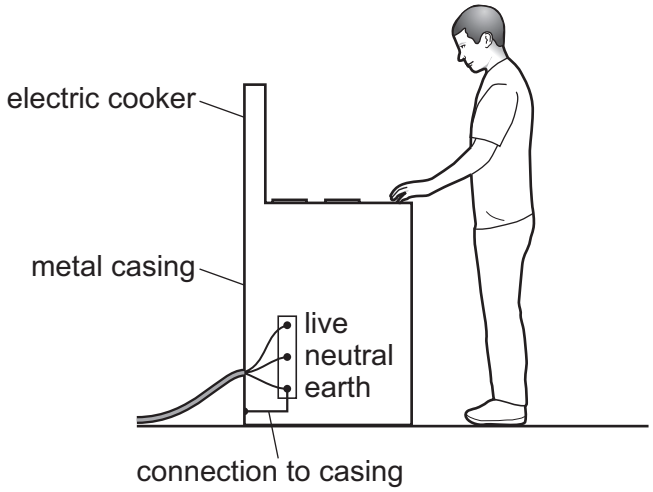
34 The combination of logic gates shown has two inputs and one output.



Which single logic gate is equivalent to this combination?

A AND **B** NOR **C** NOT **D** OR

35 A simple wiring diagram for an electric cooker is shown.



Why is there a wire connecting the metal case of the cooker to earth?

A It improves the efficiency of the cooker.

B It prevents the metal case from becoming too hot when the cooker is left on.

C It reduces the risk of an electric shock if the live wire touches the metal case.

D The electric cooker will not switch on without it.

36 α-particles are directed at a metal foil.

Most of the particles pass through the foil with little change in direction.

A small proportion of the particles are scattered back through large angles.

What does this evidence suggest about the structure of an atom?

A It consists of a charged centre much smaller than the size of the atom and with little of the mass of the atom.

B It consists of a negative charge the size of the atom containing small positive charges scattered through it.

C It consists of a charged centre much smaller than the size of the atom but with most of the mass of the atom.

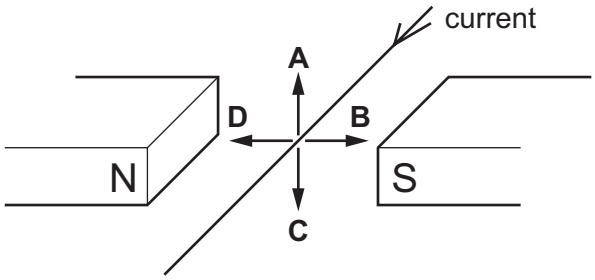
D It consists of a positive charge the size of the atom containing small negative charges scattered through it.

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[Turn over

37 A conductor carrying a current is placed in a magnetic field.

In which direction does the force on the conductor act?



38 What is nuclear fission?

A the merging of two nuclei to create a heavier nucleus

B the process by which electrons are removed from an atom

C the process by which stars generate energy

D the splitting of a nucleus to create two smaller nuclei

39 Which statement about γ-radiation is correct?

A It consists of very small charged particles.

B It is a form of electromagnetic radiation.

C It is less penetrating than β-radiation.

D It is more highly ionising than α-radiation.

40 A radium nucleus with nucleon number 226 decays by emitting an α-particle.

The proton number of radium is 88.

What are the nucleon number and proton number for the nucleus produced by this decay?

	nucleon number	proton number
A	222	86
B	222	87
C	226	86
D	226	87

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