Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICS **0625/13**

Paper 1 Multiple Choice (Core) **May/June 2021**

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 10 N (acceleration of free fall = 10 m / s^2).

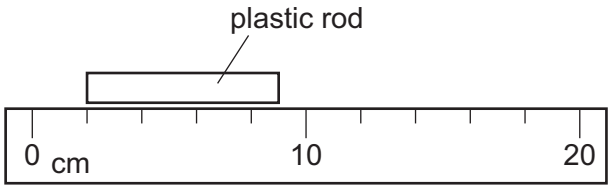
INFORMATION

- 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 The diagram shows a plastic rod alongside a ruler.



What is the length of the rod?

A 2.5 cm **B** 3.5 cm **C** 7.0 cm **D** 9.0 cm

2 Two stones of different weights fall at the same time from a table. Air resistance may be ignored.

What will happen and why?

	what will happen	why
A	Both stones hit the floor at the same time.	Acceleration of free fall is constant.
B	Both stones hit the floor at the same time.	They fall at constant speed.
C	The heavier stone hits the floor first.	Acceleration increases with weight.
D	The heavier stone hits the floor first.	Speed increases with weight.

3 A cyclist rides 300 m up a slope in 50 s.

She then rides down the slope in 25 s.

What is her average speed for the whole journey?

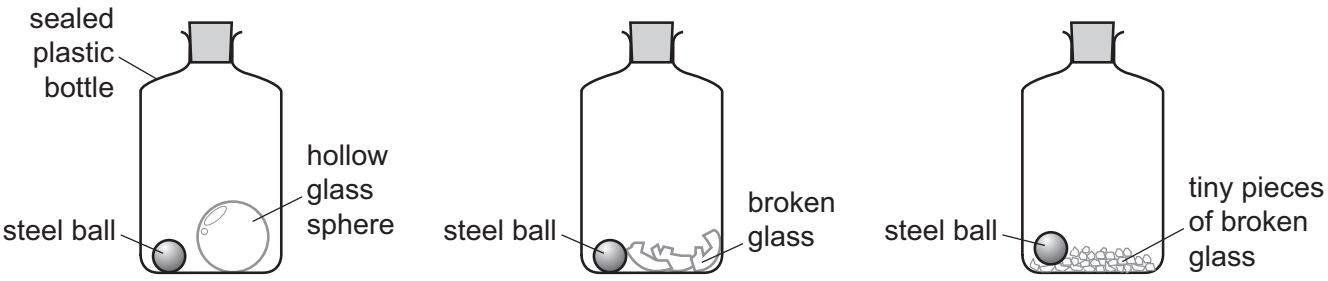
A 4.0 m/s **B** 8.0 m/s **C** 9.0 m/s **D** 16 m/s

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4 Diagram 1 shows a sealed plastic bottle containing a hollow glass sphere and a steel ball.

Diagram 2 shows the same bottle after it has been shaken.

Diagram 3 shows the same bottle after it has been shaken again until the broken glass is in tiny pieces.



The mass of the bottle and contents in diagram 1 is m_1.

The mass of the bottle and contents in diagram 2 is m_2.

The mass of the bottle and contents in diagram 3 is m_3.

Which statement gives the correct relation between m_1, m_2 and m_3?

A m_1 is equal to m_2 and m_2 is equal to m_3.

B m_1 is greater than m_2 and m_2 is greater than m_3.

C m_1 is less than m_2 and m_2 is greater than m_3.

D m_1 is less than m_2 and m_2 is less than m_3.

5 The table shows the weight of a 15.0 kg mass placed on different planets.

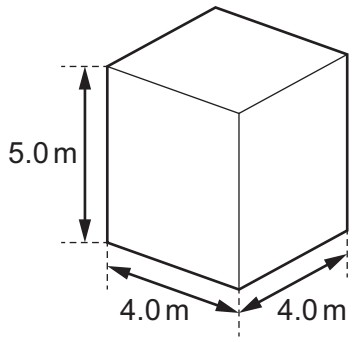
Which planet has a gravitational field strength of 11.1 N / kg?

	planet	weight of 15.0 kg mass / N
A	Jupiter	389
B	Saturn	167
C	Uranus	160
D	Neptune	211

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6 The tank shown has the dimensions 5.0 m × 4.0 m × 4.0 m.

It is completely filled with water of density 1000 kg / m^3.



What is the mass of water in the tank?

A 12.5 kg **B** 62.5 kg **C** 16 000 kg **D** 80 000 kg

7 A train travels at a constant speed along a straight track.

Which statement about the resultant force on the train is correct?

A It is bigger than the thrust of the engine.

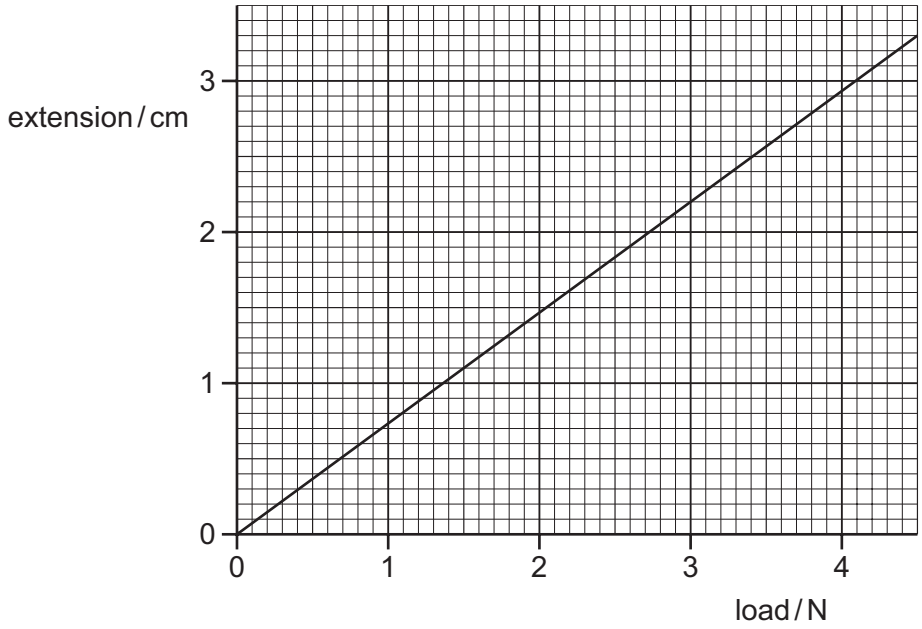
B It is constantly increasing.

C It is equal to the thrust of the engine.

D It is zero.

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8 The extension–load graph for a spring is shown. The unstretched length of the spring is 17.0 cm.



When an object is suspended from the spring, the length of the spring is 19.2 cm.

What is the weight of the object?

A 1.4 N **B** 1.6 N **C** 2.6 N **D** 3.0 N

9 A stream flows out of a lake and down the side of a hill.

What best describes the change in energy stores?

A kinetic energy → chemical energy + internal energy

B gravitational potential energy → kinetic energy + internal energy

C gravitational potential energy + kinetic energy → internal energy

D kinetic energy → internal energy + gravitational potential energy

10 Energy resources are often used to turn a generator to produce electrical energy.

From which resource can electrical energy be produced **without** turning a generator?

A radiation from the Sun

B uranium by nuclear fission

C water behind a dam

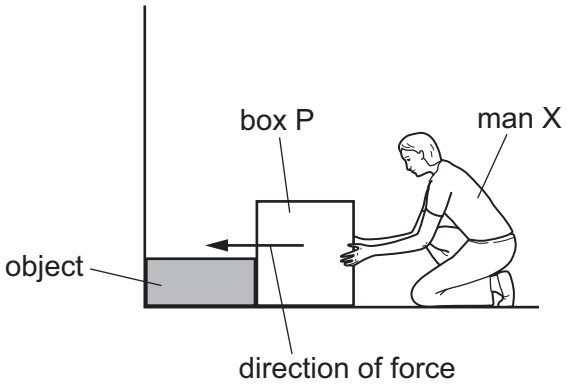
D wind

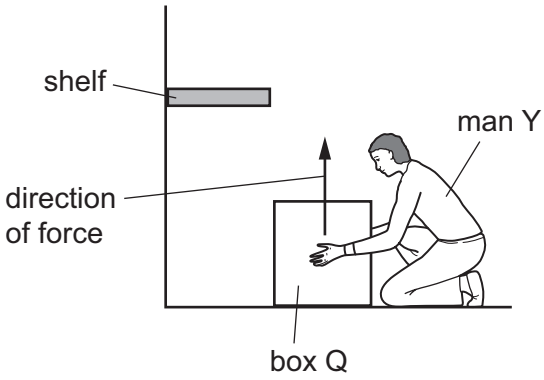
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11 Two men, X and Y, try to move identical heavy boxes, P and Q.

Man X tries to push box P along the floor. The box does not move because an object is in the way.

Man Y lifts box Q from the floor onto a shelf.





Which man does the most work on their box, and which box gains the most energy?

	man doing most work	box gaining most energy
A	X	P
B	X	Q
C	Y	P
D	Y	Q

12 A book has a mass of 400 g.

The surface of the book in contact with a table has dimensions 0.10 m × 0.20 m.

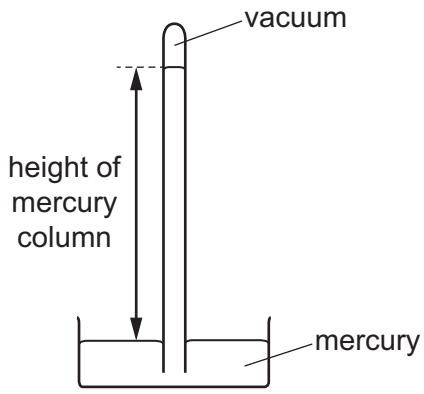
The gravitational field strength *g* is 10 N / kg.

What is the pressure exerted on the table due to the book?

A $0.08\,N/m^2$ **B** $8.0\,N/m^2$ **C** $20\,N/m^2$ **D** $200\,N/m^2$

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13 The diagram shows a piece of equipment which is used to measure atmospheric pressure.



What is this piece of equipment?

A barometer

B galvanometer

C newton meter

D thermometer

14 A car tyre contains air.

The temperature of the air in the tyre rises. The volume of the air in the tyre remains constant.

Students are asked to suggest how this temperature rise will affect the movement of the air molecules.

1 The air molecules will move faster.

2 The air molecules will hit the tyre walls more often.

3 The air molecules will hit the tyre walls harder.

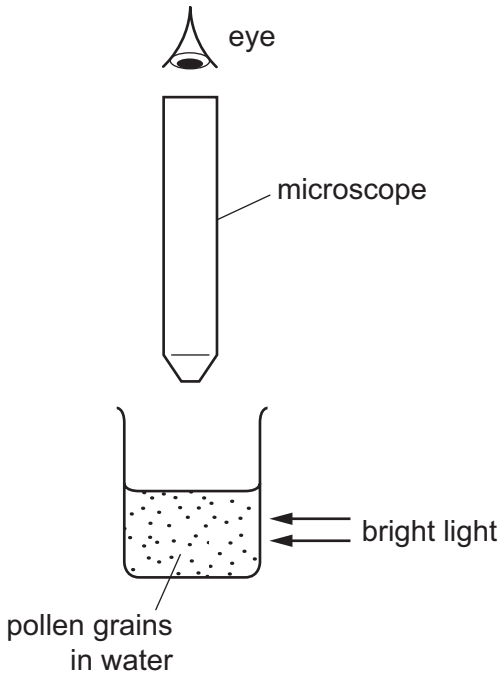
Which suggestions are correct?

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

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15 Very small pollen grains are suspended in water. A bright light shines from the side.

When looked at through a microscope, small specks of light are seen to be moving in a random, jerky manner.



What are the moving specks of light?

A pollen grains being hit by other pollen grains

B pollen grains being hit by water molecules

C water molecules being hit by other water molecules

D water molecules being hit by pollen grains

16 The liquid level in a thermometer rises when the thermometer is placed in hot water.

What causes this?

A The liquid contracts.

B The liquid evaporates.

C The liquid expands.

D The liquid freezes.

17 Which description of condensation is correct?

A a gas changing into a liquid as its molecules lose energy

B a gas changing into a liquid as its molecules gain energy

C a liquid changing into a gas as its molecules lose energy

D a liquid changing into a gas as its molecules gain energy

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18 The thermal capacity of object Y is greater than that of object Z.

What is a consequence of this?

A Object Y needs less thermal energy to melt it than object Z.

B Object Y needs less thermal energy to raise its temperature by 1 °C than object Z.

C Object Y needs more thermal energy to melt it than object Z.

D Object Y needs more thermal energy to raise its temperature by 1 °C than object Z.

19 In which states of matter is convection an important method of thermal transfer?

A liquids only

B solids only

C liquids and gases

D solids and gases

20 Solar heating panels consist of pipes carrying water that absorb radiation from the Sun.

Which texture and colour are the surface of the pipes so that the temperature of the water rises at the quickest rate?

A dull black

B dull white

C shiny black

D shiny white

21 A child bounces up and down on a trampoline. The instructor asks her to bounce with a higher frequency.

What does the instructor mean?

A Bounce higher on the trampoline.

B Bounce more times in each minute.

C Take more time to bounce.

D Bounce with a slower speed.

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22 Light waves pass through a gap. The diagrams show two possibilities for what occurs.

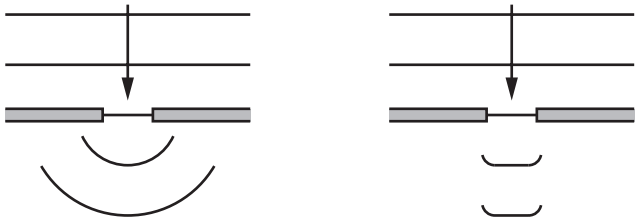


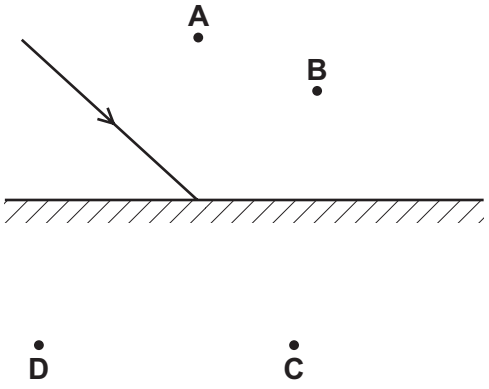
diagram 1 diagram 2

Which row is correct?

	the effect on the wave as it passes through the gap	diagram after it has passed through the gap
A	speed changes	diagram 1 is correct
B	speed changes	diagram 2 is correct
C	speed remains constant	diagram 1 is correct
D	speed remains constant	diagram 2 is correct

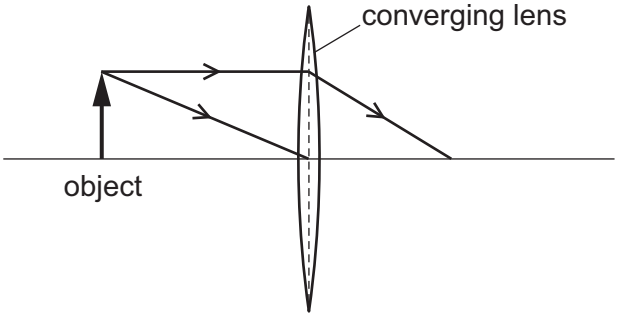
23 The diagram shows a ray of light striking a plane mirror.

Through which point does the reflected ray pass?



24 An object is placed in front of a thin converging lens.

The diagram shows the paths of two rays from the top of the object.



An image of the object is formed on a screen to the right of the lens.

How does this image compare with the object?

A It is larger and inverted.

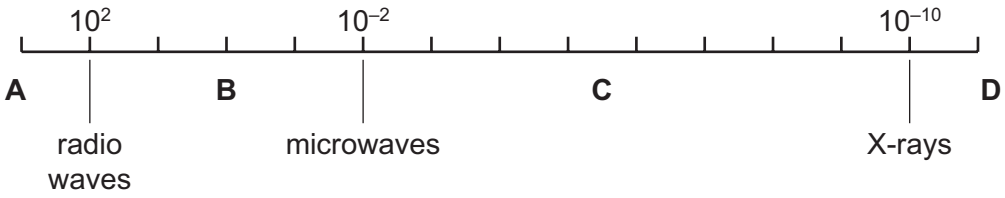
B It is larger and the same way up.

C It is smaller and inverted.

D It is smaller and the same way up.

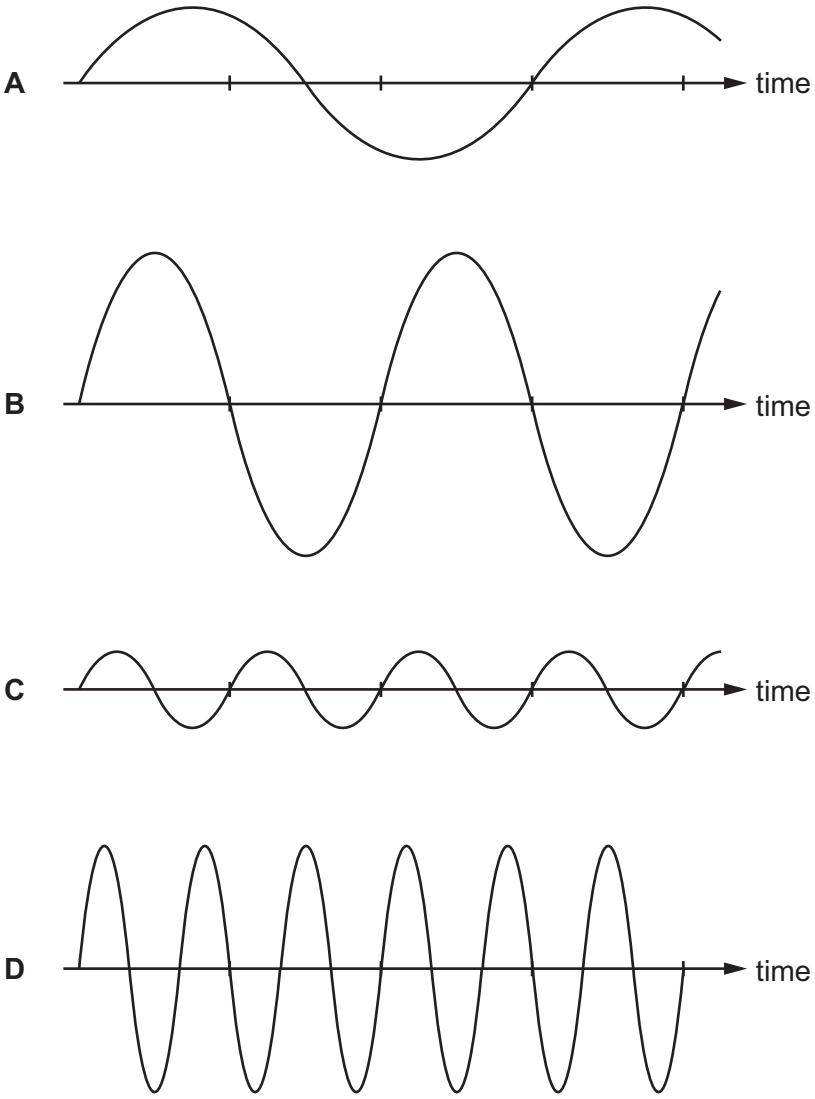
25 The diagram shows typical wavelengths (in metres) of radio waves, microwaves and X-rays in the electromagnetic spectrum.

In which region are the waves used in TV remote controllers found?



26 The diagrams represent the waves produced by four sources of sound. The scales are the same for all the diagrams.

Which sound has the highest frequency?



27 Which description of ultrasound is correct?

A longitudinal waves with a frequency greater than 20 000 Hz

B longitudinal waves with a frequency less than 20 Hz

C transverse waves with a frequency greater than 20 000 Hz

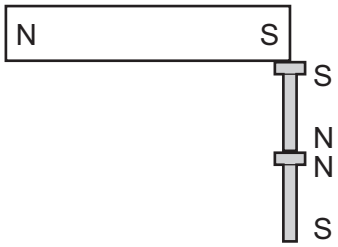
D transverse waves with a frequency less than 20 Hz

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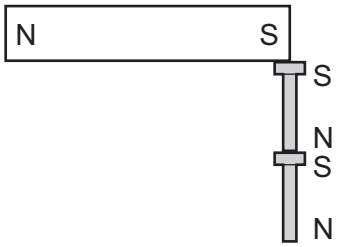
28 A bar magnet picks up two steel bolts.

Which diagram shows the magnetic poles induced in the bolts?

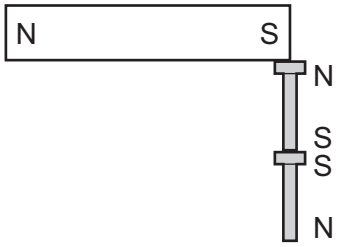
A



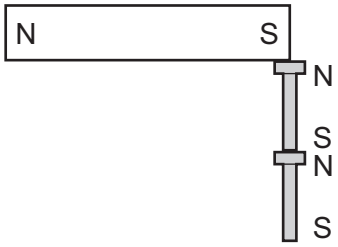
B



C

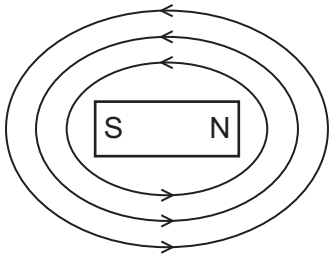


D

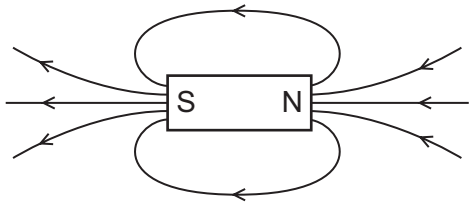


29 Which diagram shows the magnetic field around a bar magnet?

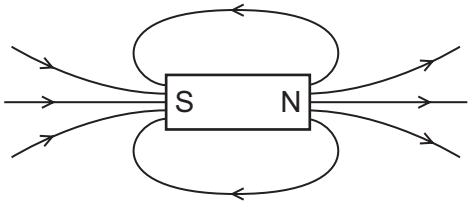
A



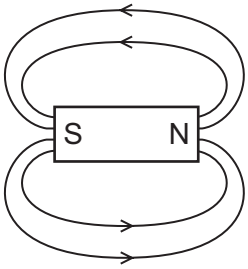
B



C



D



30 A student rubs a plastic rod with a cloth.

The rod becomes positively charged.

What has happened to the rod?

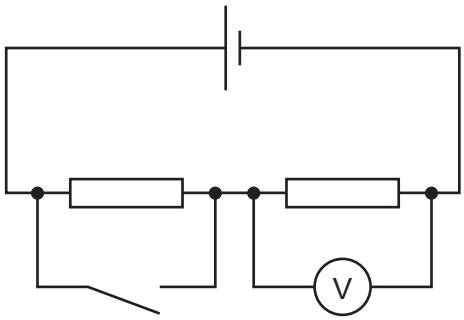
A It has gained electrons.

B It has gained protons.

C It has lost electrons.

D It has lost protons.

31 The diagram shows a circuit containing a cell, two resistors, a switch and a voltmeter.



When the switch is open the voltmeter reads 1.5 V.

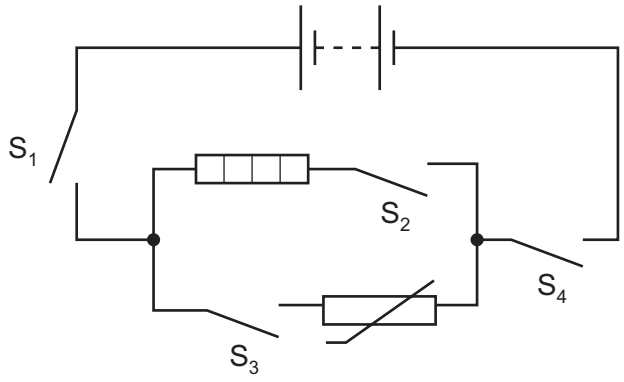
When the switch is closed the voltmeter reads 2.0 V.

What is the electromotive force (e.m.f.) of the cell?

A 0.5 V **B** 1.5 V **C** 2.0 V **D** 3.5 V

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32 The circuit in the diagram contains four switches, S_1, S_2, S_3 and S_4.



Which three switches must be closed for the heater to work?

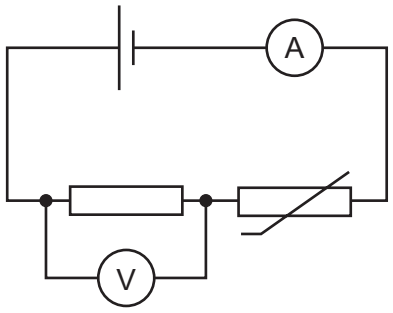
A S_1, S_2 and S_3

B S_1, S_2 and S_4

C S_1, S_3 and S_4

D S_2, S_3 and S_4

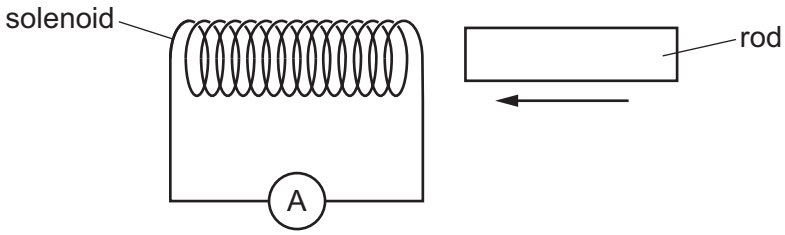
33 The diagram shows a circuit.



What happens to the readings on the voltmeter and on the ammeter when the temperature of the thermistor increases?

	voltmeter reading	ammeter reading
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

34 A solenoid is connected to a very sensitive ammeter. A rod is inserted into one end of the solenoid. The ammeter shows that there is a small electric current in the solenoid while the rod is moving.



Which rod is being inserted?

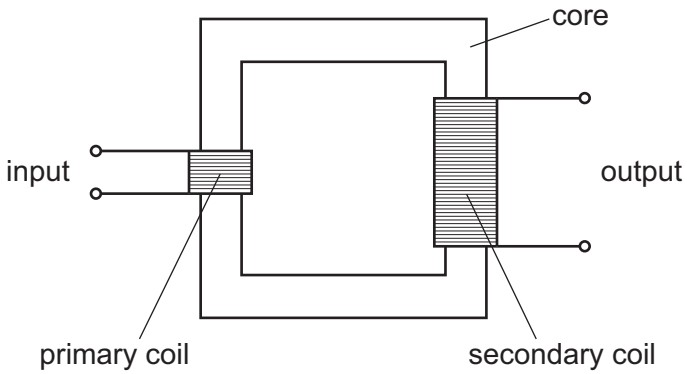
A a heated copper rod

B a magnetised steel rod

C an uncharged nylon rod

D a radioactive uranium rod

35 The diagram shows a transformer with more turns on the secondary coil than on the primary coil.



Which row is correct?

	material of core	material of coils	type of transformer
A	copper	iron	step-up
B	copper	iron	step-down
C	iron	copper	step-up
D	iron	copper	step-down

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36 Diagram 1 shows a wire carrying an electric current into the page.

The wire is between the poles of a magnet.

A force is produced on the wire acting down towards the bottom of the page.

Diagram 2 shows the situation after the current is reversed and the magnet is turned through 90°.

diagram 1

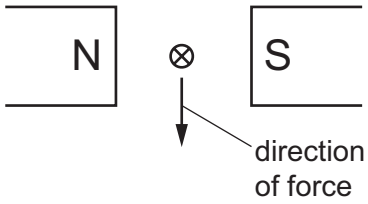


diagram 2



In which direction does the force act after these changes?

A towards the top of the page

B towards the bottom of the page

C towards the left-hand side of the page

D towards the right-hand side of the page

37 The charge on a proton is *e*.

What is the charge on an electron and what is the charge on a neutron?

	electron	neutron
A	*e*	*e*
B	*e*	0
C	$-e$	$-e$
D	$-e$	0

38 The nuclide notation for sodium-23 is $^{23}_{11}\mathrm{Na}$.

How many protons are in a nucleus of sodium-23?

A 11 **B** 12 **C** 23 **D** 34

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39 A student is investigating the count rate of a radioactive substance.

How must he adjust his reading for the background count?

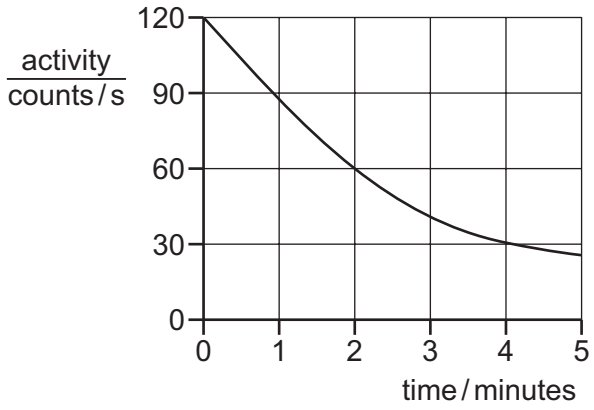
A Add the background count to his reading.

B Ignore the background count as it will not affect his reading.

C Subtract the background count from his reading.

D Take repeat readings to eliminate the background count.

40 The graph shows the activity of a radioactive source over a period of time.



What is the half-life of the source?

A 1.0 minute **B** 2.0 minutes **C** 2.5 minutes **D** 4.0 minutes

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