Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICS **0625/12**

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.

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1 Which piece of apparatus is the most suitable for measuring the mass of a pencil sharpener?

A digital balance

B measuring cylinder

C newton meter

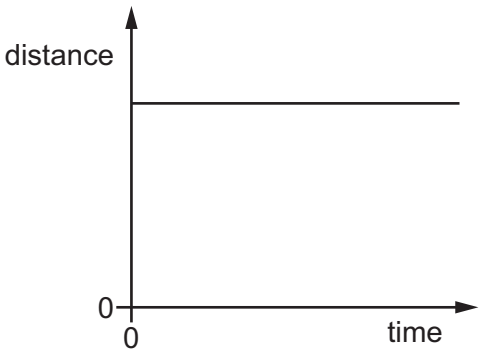
D ruler

2 A cyclist records his speed and the distance travelled during a journey.

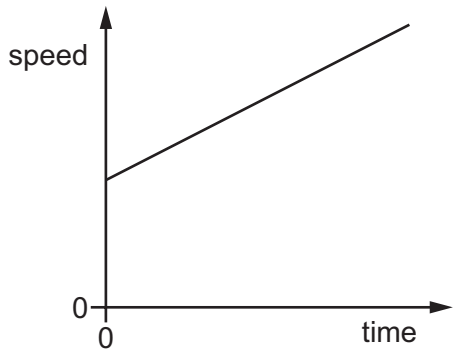
He then plots the data against time for different sections of his journey.

Which graph shows a section when he is moving with constant speed?

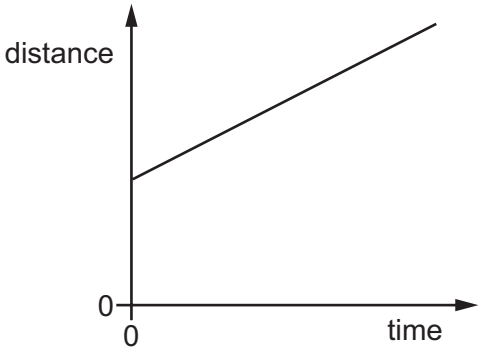
A



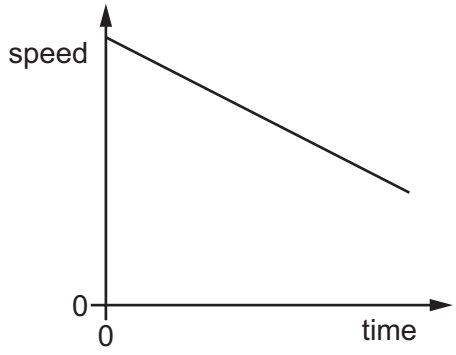
B



C



D



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

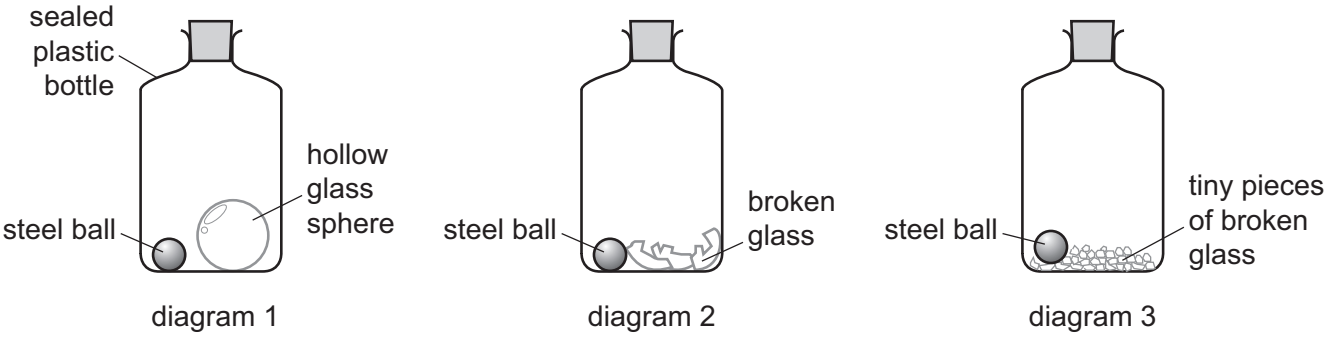
What will happen and why?

	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.

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.

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5 An astronaut wants to know how much she would weigh on different moons.

She measures her mass on Earth to be 82 kg. She researches the values of g on different moons and uses these values to calculate her weight.

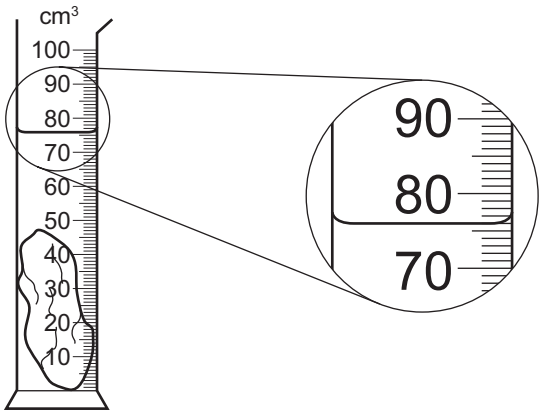
The results are shown.

Which weight is calculated correctly?

	name of moon	$\frac{g}{\text{N/kg}}$	calculated weight / N
A	Callisto	1.2	68
B	Charon	0.28	23
C	Dione	0.23	2.3
D	Umbriel	0.23	0.0028

6 A measuring cylinder contains 40 cm^3 of water.

A stone of mass 94 g is lowered into the water so that it is fully submerged as shown.

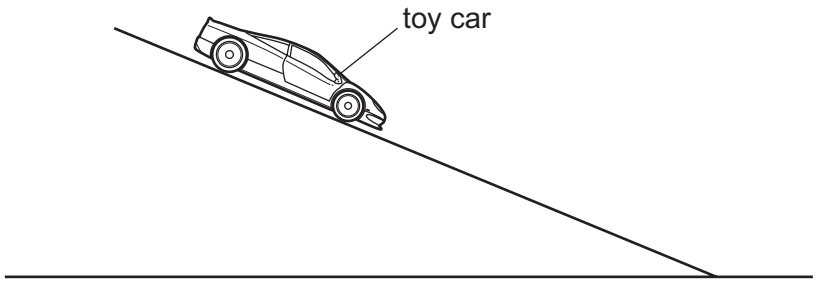


What is the density of the stone?

A 1.1 g / cm^3 **B** 1.2 g / cm^3 **C** 2.1 g / cm^3 **D** 2.6 g / cm^3

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7 A toy car travels down a sloping ramp at constant speed.



Which statement about the forces acting on the car is correct?

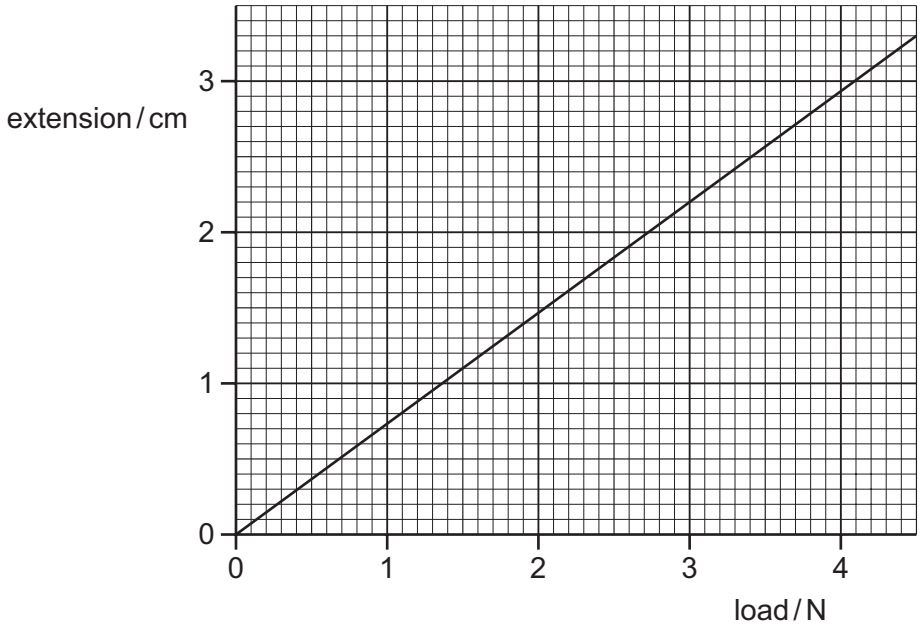
A There are no forces acting on the car vertically.

B There is no resultant force acting on the car.

C There is no gravitational force acting on the car.

D There is no frictional force acting on the car.

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 An object is falling through a vacuum.

Which energy transfer is taking place?

A gravitational potential to kinetic

B gravitational potential to thermal

C kinetic to gravitational potential

D kinetic to thermal

10 This question is about four methods used to produce electrical energy.

Which method has a correct description?

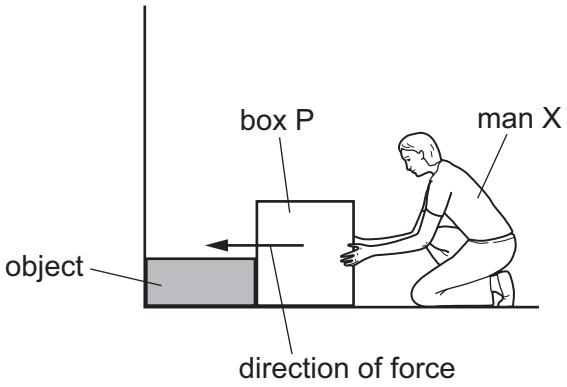
	method	energy source is renewable	emits carbon dioxide
A	a hydroelectric power station	yes	no
B	a coal-fired power station	no	no
C	a wind turbine	no	yes
D	a nuclear power station	yes	yes

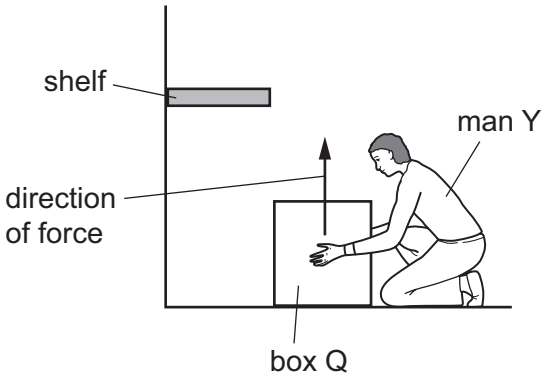
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11 Two men, X and Y, try to move identical heavy boxes, P and Q.

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.

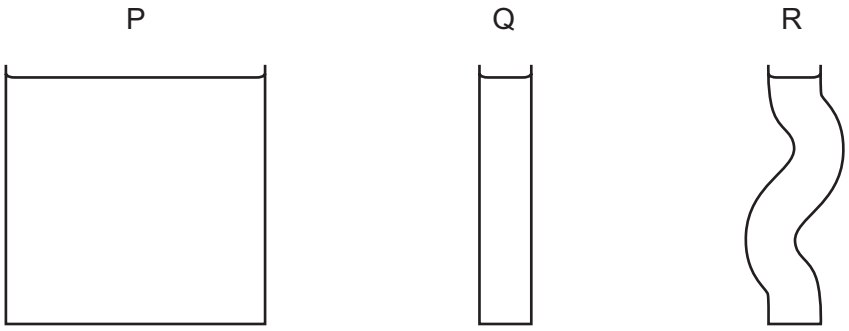
The gravitational field strength *g* is 10 N / kg.

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 diagrams show three containers, P, Q and R.



Each container contains the same liquid.

The depth of the liquid is the same in each container.

Which statement about the pressure of the liquid at the bottom of the container is correct?

A The pressure of the liquid at the base of P is greatest.

B The pressure of the liquid at the base of Q is greatest.

C The pressure of the liquid at the base of R is greatest.

D The pressures of the liquid at the bases of P, Q and R are the same.

14 A person taking a shower notices that water appears on the inside of the bathroom window, even though the window is some distance from the shower.

Which statement explains this observation?

A Droplets of water from the hot shower move through the air and onto the window.

B The colder window causes the steam in the atmosphere to solidify.

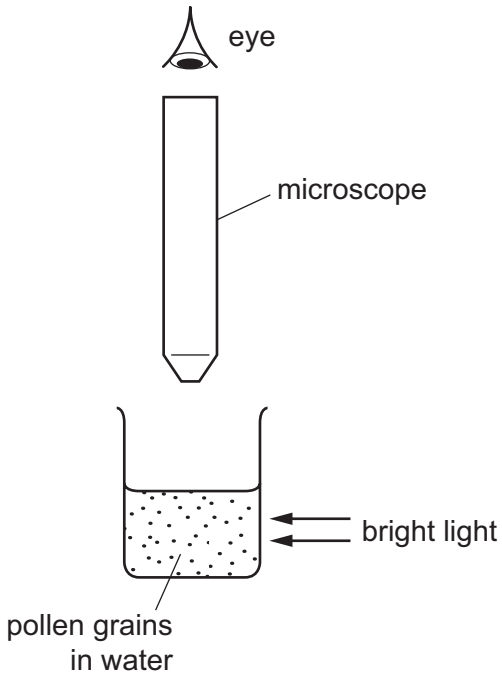
C Water vapour from the atmosphere condenses onto the colder window.

D The hot water boils and turns into steam.

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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 A hole is drilled in a metal plate.

What happens to the length of the plate and to the diameter of the hole when the plate is cooled?

	length of plate	diameter of hole
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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17 A liquid-in-glass thermometer uses alcohol as its liquid.

Which property of alcohol is used to measure the temperature?

A boiling point

B colour

C thermal capacity

D volume

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 The table gives some examples of convection and an explanation of why the convection occurs.

Which row is correct?

	example	explanation
A	air conditioner unit	The unit is placed in a high position to circulate the cold air rising from the floor level and so keeping the room cold.
B	convection oven	The air in the oven becomes more dense when heated so it falls to the bottom heating the food faster.
C	hot-air balloon	Air inside the balloon becomes less dense which causes the balloon to rise.
D	land and sea breezes	A breeze forms due to the warm air above the land moving down towards the sea.

20 In which situation is radiation the main method by which energy is transferred?

A heating a pan of water using a gas camping stove

B energy reaching the Earth from the Sun

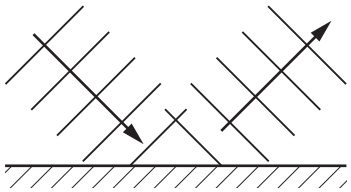
C heating the air in a room with a radiator

D giving gravitational potential energy to a glider when it is lifted by thermal currents

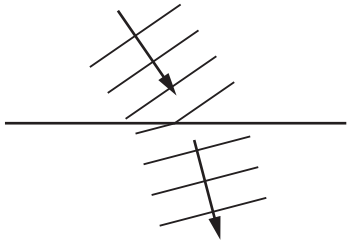
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21 Which diagram shows waves diffracting?

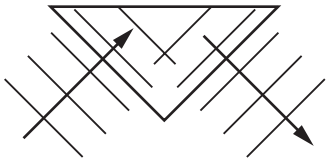
A



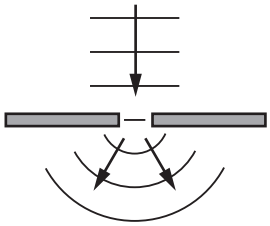
B



C



D



22 Which statement about the image of an object formed in a plane mirror is correct?

A It is smaller than the object.

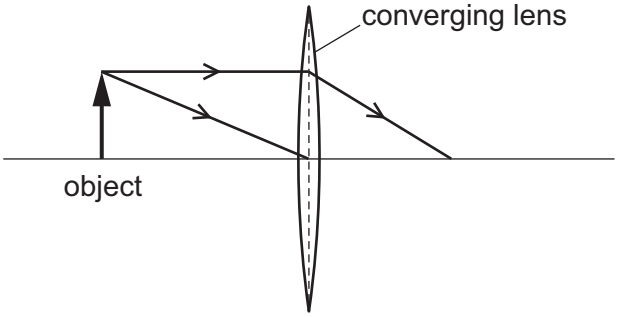
B It is the same size as the object.

C It is larger than the object.

D It is inverted.

23 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.

24 The table shows information about different colours of light.

colour of light	frequency / Hz
violet	7.2×10^{14}
blue	6.3×10^{14}
yellow	5.2×10^{14}
red	4.5×10^{14}

Using the data, what is the frequency of orange light?

A 4.0×10^{14} Hz

B 5.0×10^{14} Hz

C 6.0×10^{14} Hz

D 7.0×10^{14} Hz

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25 Sound is a transfer of energy from an oscillating source.

Which statement describes how sound energy is transferred?

A a longitudinal wave with the oscillation parallel to the direction in which energy is transferred

B a longitudinal wave with the oscillation perpendicular to the direction in which energy is transferred

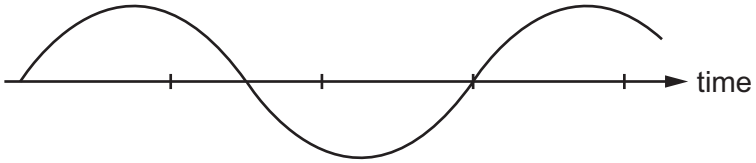
C a transverse wave with the oscillation parallel to the direction in which energy is transferred

D a transverse wave with the oscillation perpendicular to the direction in which energy is transferred

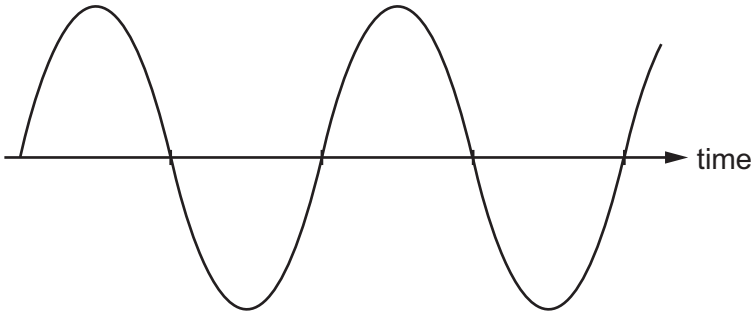
26 The diagrams represent the waves produced by four sources of sound. The scales are the same for all the diagrams.

Which sound has the highest frequency?

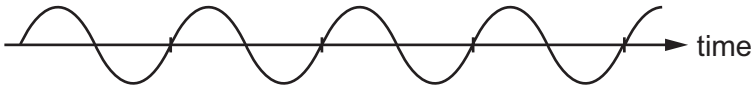
A



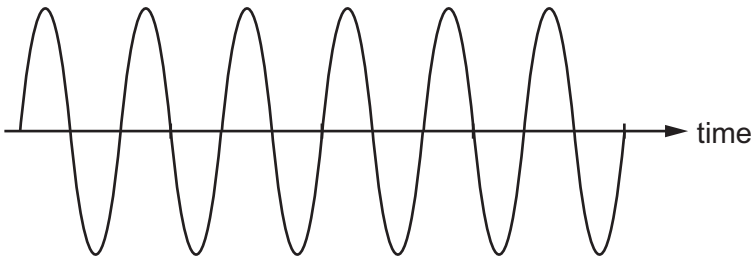
B



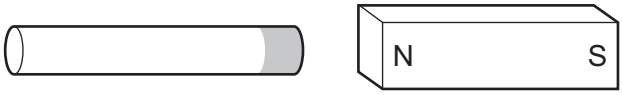
C



D



27 Two metal rods each have a painted end. The painted ends are placed next to the N pole and S pole of a bar magnet in turn.



The rods are made from iron, aluminium or magnetised steel.

rod	placed next to	observation
1	N pole of bar magnet	attracts
1	S pole of bar magnet	attracts
2	N pole of bar magnet	nothing happens
2	S pole of bar magnet	nothing happens

What are rod 1 and rod 2 made from?

	rod 1	rod 2
A	magnetised steel	aluminium
B	iron	magnetised steel
C	aluminium	iron
D	iron	aluminium

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28 Three piles of small nails, P, Q and R, are placed on a bench below three electromagnets.

One set of nails is made of copper, one of soft iron and one of steel.

Diagram 1 shows the situation when the electromagnets are switched on.

Diagram 2 shows the situation when the electromagnets are then switched off.

diagram 1
the switches are **closed**

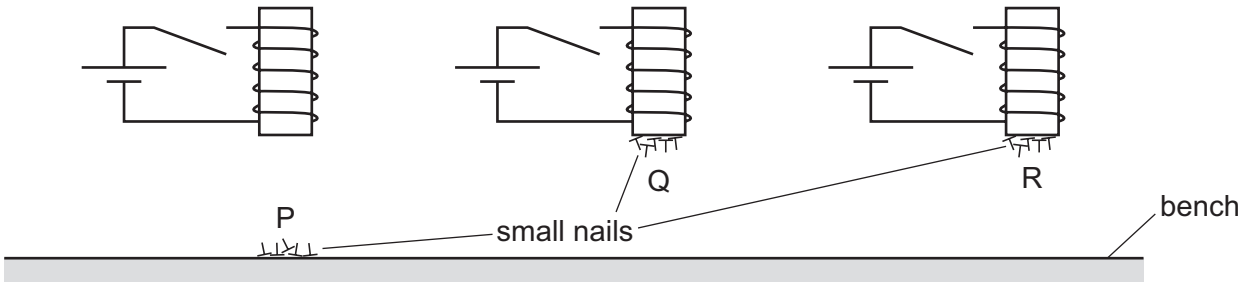
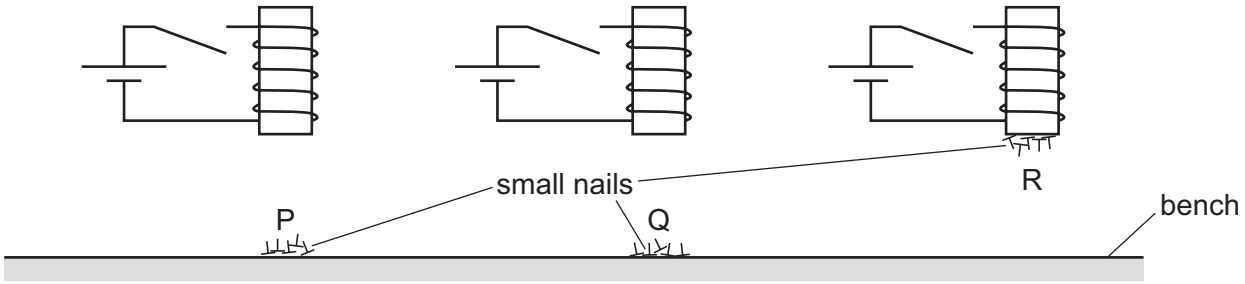


diagram 2
the switches are **open**



Which row correctly identifies the materials from which the nails are made?

	copper	soft iron	steel
A	P	Q	R
B	P	R	Q
C	Q	P	R
D	Q	R	P

29 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.

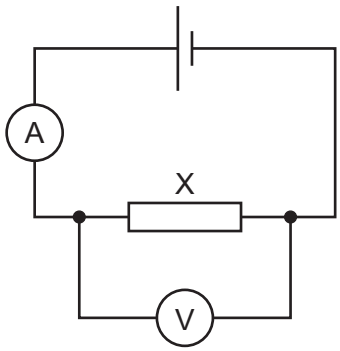
B It has gained protons.

C It has lost electrons.

D It has lost protons.

30 A student connects a circuit with a resistor X. The reading on the ammeter is 2.0 A.

The reading on the voltmeter is 6.0 V.



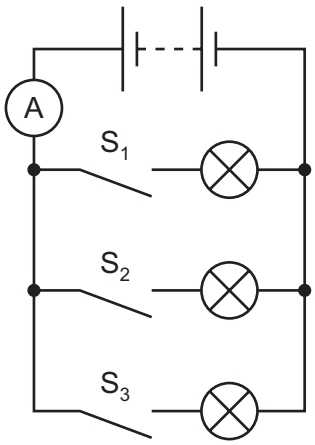
She needs to produce a circuit with a total resistance of 10 Ω.

Which resistor should she add in series to the circuit?

A 2 Ω **B** 3 Ω **C** 7 Ω **D** 10 Ω

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31 The diagram shows a circuit containing a battery, an ammeter, three switches, S_1, S_2 and S_3, and three identical lamps.



With only switch S_1 closed, the reading on the ammeter is 0.04 A.

Which row states the **incorrect** ammeter reading for the switch conditions given?

	switch S_1	switch S_2	switch S_3	ammeter reading / A
A	open	open	open	0.00
B	open	closed	open	0.04
C	open	open	closed	0.08
D	closed	closed	closed	0.12

32 Two 10 Ω resistors are connected in series and then in parallel.

What is the combined resistance in each case?

	resistance in series / Ω	resistance in parallel / Ω
A	10	5
B	10	10
C	20	5
D	20	10

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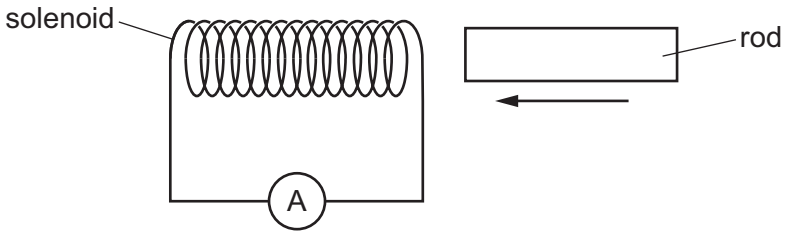
33 The information on the back of a television is shown.

220–240 V
~50 Hz
0.6 A

Which fuse provides the best protection for the circuit?

A 0.5 A **B** 1 A **C** 5 A **D** 13 A

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?

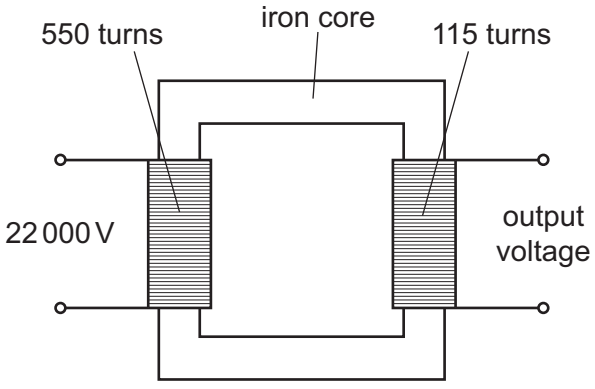
A a heated copper rod

B a magnetised steel rod

C an uncharged nylon rod

D a radioactive uranium rod

35 The diagram shows a transformer.

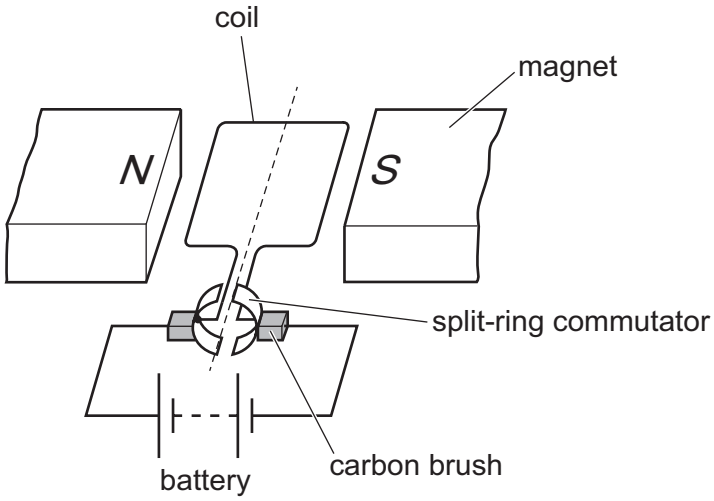


What is the output voltage?

A 0.35 V **B** 2.9 V **C** 4600 V **D** 105 000 V

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36 The diagram shows a d.c. motor.



Which two changes together will always make the coil spin more slowly?

A Decrease the current in the coil and use a magnet of less strength.

B Decrease the current in the coil and increase the number of turns on the coil.

C Increase the current in the coil and use a magnet of less strength.

D Increase the current in the coil and decrease the number of turns on the coil.

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 proton numbers and nucleon numbers of four nuclides are shown.

$^{231}_{88}\text{Ra}$ $^{232}_{90}\text{Th}$ $^{238}_{92}\text{U}$ $^{239}_{94}\text{Pu}$

Which statement is correct?

A Plutonium (Pu) contains one more proton then uranium (U).

B Thorium (Th) contains one more neutron than radium (Ra).

C Thorium (Th) contains one more proton than radium (Ra).

D Uranium (U) contains one more neutron than plutonium (Pu).

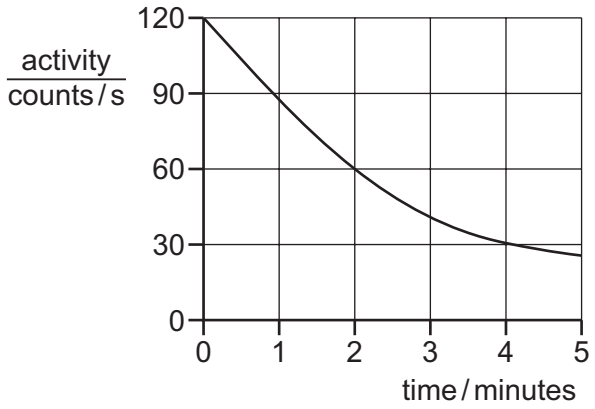
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39 A radioactive atom decays by emission of a β-particle.

Which row is correct?

	what decays	what happens to the atom
A	the nucleus of the atom	it becomes a different element
B	the nucleus of the atom	it becomes a lighter version of the same element
C	the outer layers of the atom	it becomes a different element
D	the outer layers of the atom	it becomes a lighter version of the same element

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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