Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICS **0625/13**

Paper 1 Multiple Choice (Core) **October/November 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 **16** pages.

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1 A teacher asks a student to measure the volume of a pencil sharpener.

Which piece of apparatus would **not** be useful?

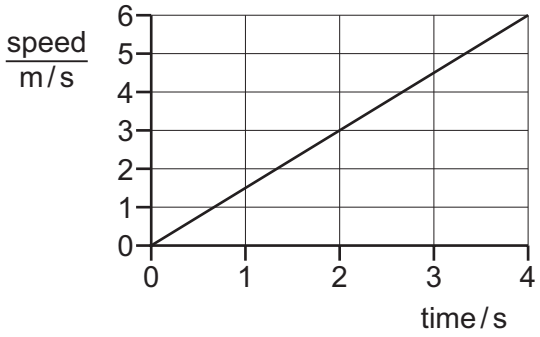
A beaker

B displacement can

C balance

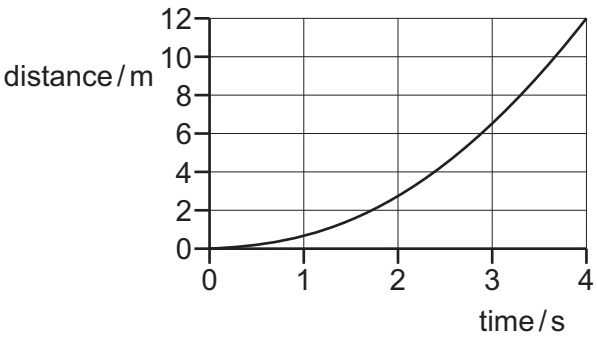
D measuring cylinder

2 The graph shows how the speed of a car varies with time at the start of a journey.

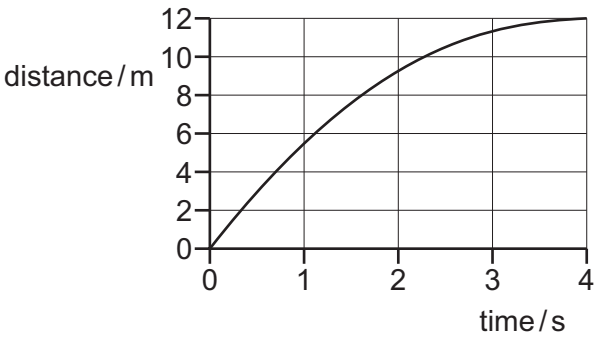


Which distance–time graph represents the motion of the car over the same time period?

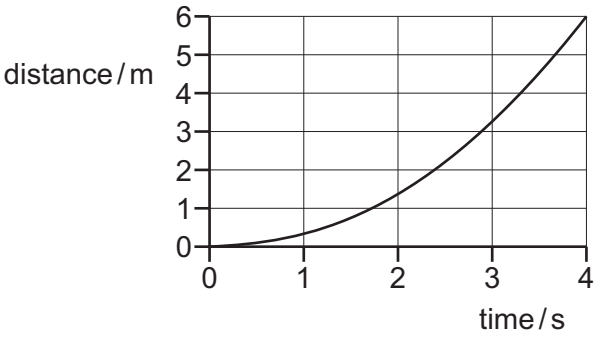
A



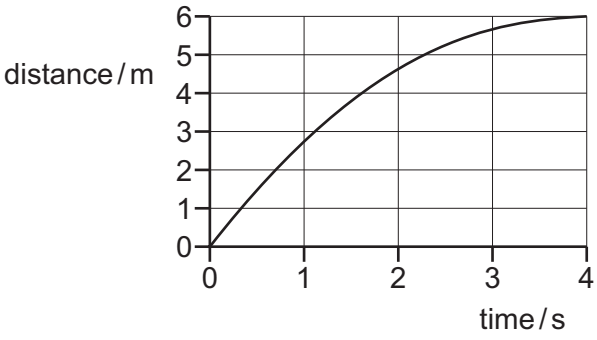
B



C



D



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3 A student uses a force meter to measure the weights and a balance to measure the masses of four different objects.

He puts his measurements in a table.

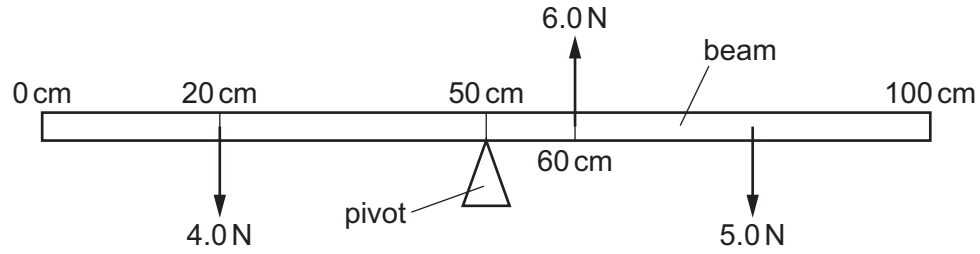
Which row is correctly recorded?

	mass	weight
A	1 kg	10 N
B	5 g	50 N
C	10 N	100 kg
D	20 kg	2 N

4 Which substance in the table has the lowest density?

	substance	mass / g	volume / cm^3
A	nylon	1.2	1.0
B	cotton	1.5	1.0
C	olive oil	1.8	2.0
D	water	2.0	2.0

5 The diagram shows a uniform beam 100 cm long. The diagram is not drawn to scale.



The beam remains balanced on a pivot at the 50 cm mark under the action of the forces of 4.0 N, 5.0 N and 6.0 N.

The 4.0 N force is at the 20 cm mark and the 6.0 N force is at the 60 cm mark.

At which point on the beam is the 5.0 N force acting?

A at the 62 cm mark

B at the 74 cm mark

C at the 86 cm mark

D at the 88 cm mark

6 A spacecraft is travelling in space with no resultant force and no resultant moment acting on it.

Which statement about the spacecraft is correct?

A Its direction is changing.

B It is in equilibrium.

C Its speed is decreasing.

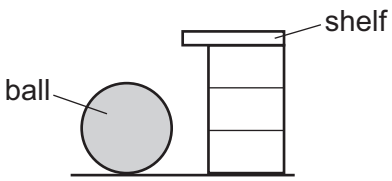
D Its speed is increasing.

7 A weightlifter picks up a stone ball and places it on a shelf.

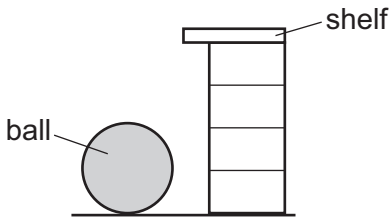
Each lift takes the same time.

Which situation requires the greatest power?

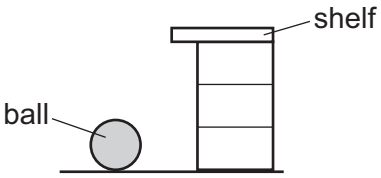
A



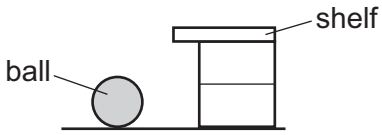
B



C



D



8 Electrical energy may be obtained from nuclear fission.

In which order is the energy transferred in this process?

A nuclear fuel → generator → reactor and boiler → turbines

B nuclear fuel → generator → turbines → reactor and boiler

C nuclear fuel → reactor and boiler → generator → turbines

D nuclear fuel → reactor and boiler → turbines → generator

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9 A person lifts a book from floor level to a shelf. It falls to the floor and a second person lifts it back up to the shelf.

Which statement **must** be correct?

A The second person does the same work on the book as the first person.

B The second person takes the same time as the first person.

C The second person develops the same power as the first person.

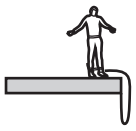
D The second person does the same work on the book as the first person, develops the same power and takes the same time.

10 A man, attached to an elastic cord, jumps from a platform. He falls 60 m before starting to rise. The length of the unextended cord is 30 m.

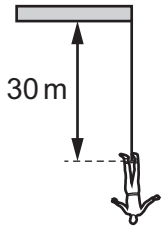
The diagrams show four successive stages in his fall.

In which position is elastic (strain) energy and kinetic energy present?

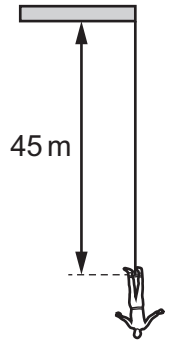
A



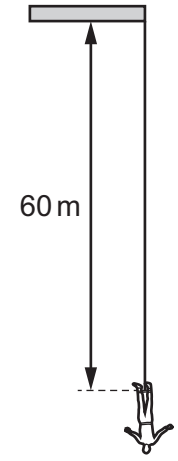
B



C



D



11 Liquid is stored in a tank. The area of the base of the tank is 2.2 m^2 and the pressure at the base due to the liquid is 15 000 Pa.

What is the weight of the liquid?

A 3300 N **B** 6800 N **C** 15 000 N **D** 33 000 N

12 A liquid is evaporating. The liquid is not boiling.

Which statement about the liquid is correct at an instant in time?

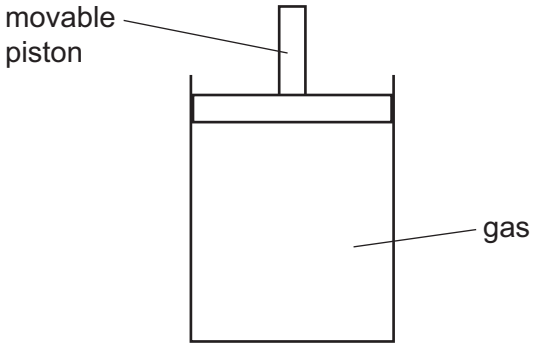
A Any molecule can escape, and from any part of the liquid.

B Any molecule can escape, but only from the liquid's surface.

C Only molecules with enough energy can escape, and only from the liquid's surface.

D Only molecules with enough energy can escape, but from any part of the liquid.

13 The diagram shows a sealed gas cylinder with a movable piston.



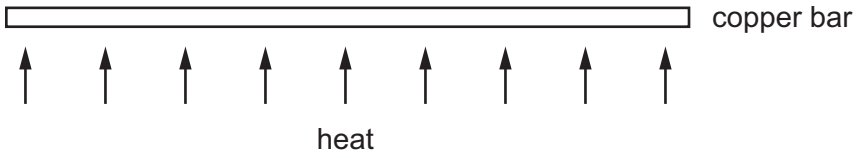
The piston is moved slowly downwards and there is no change in temperature of the gas.

What happens to the average distance between the gas molecules and to the pressure of the gas?

	average distance between gas molecules	pressure of gas in cylinder
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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14 A long, thin bar of copper is heated gently and evenly along its length.



What happens to the bar?

A It becomes less heavy.

B It becomes longer.

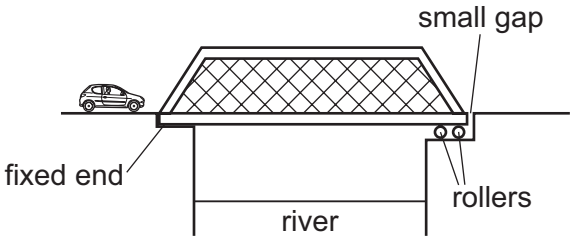
C It becomes shorter.

D It bends at the ends.

15 The diagrams show four examples of thermal expansion. In three of the examples, thermal expansion is useful. In one of the examples, expansion is unwanted and has to be allowed for.

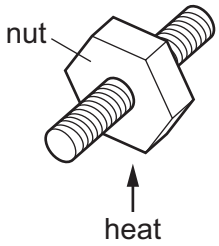
In which example is thermal expansion unwanted?

A



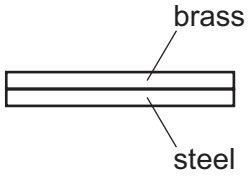
a bridge getting
longer in hot weather

B



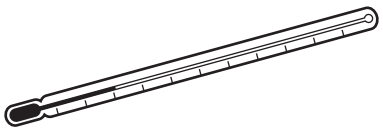
loosening a very
tight nut by heating it

C



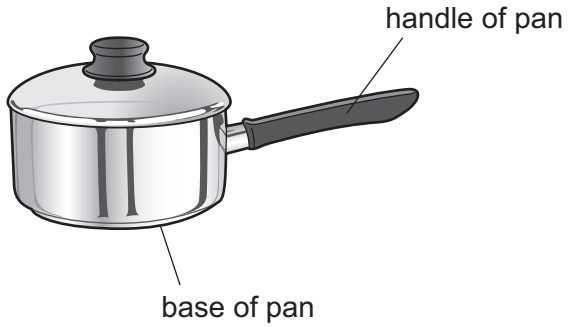
a bimetallic strip
to indicate temperature

D



liquid-in-glass
thermometer

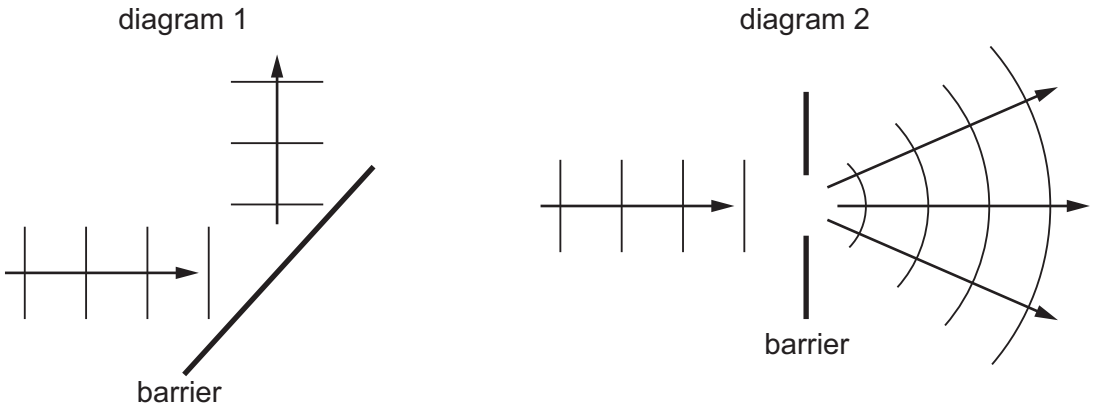
16 The diagram shows a pan used for cooking food.



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

17 The diagrams show two patterns produced by water waves.



Which two effects are shown in the diagrams?

	diagram 1	diagram 2
A	reflection	diffraction
B	reflection	refraction
C	refraction	diffraction
D	refraction	reflection

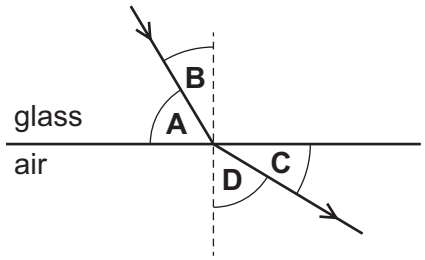
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18 Which row correctly defines the frequency and the speed of a wave?

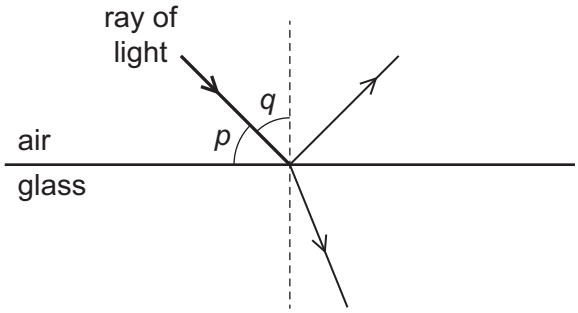
	frequency	speed
A	number of waves	distance travelled per unit time
B	number of waves	time taken for one complete wave to pass a point
C	number of waves passing per unit time	distance travelled per unit time
D	number of waves passing per unit time	time taken for one complete wave to pass a point

19 A narrow beam of light travels through glass. It reaches the edge of the glass and refracts into the air.

What is the angle of refraction?



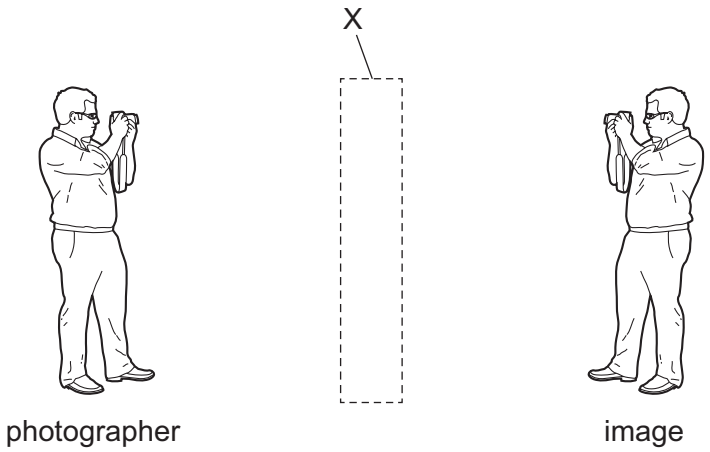
20 The diagram shows a ray of light in air incident on a glass block. Some of the light is refracted and some of the light is reflected. Two angles, *p* and *q*, are marked on the diagram.



Which row gives the angle of incidence and states whether total internal reflection occurs?

	angle of incidence	total internal reflection
A	*p*	no
B	*p*	yes
C	*q*	no
D	*q*	yes

21 A photographer sees his image as shown.



What could X be?

A



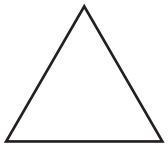
mirror

B



translucent glass block

C



transparent glass prism

D



transparent semicircular glass block

22 Visible light, X-rays and microwaves are all components of the electromagnetic spectrum.

Which statement about the waves is correct?

A In a vacuum, microwaves travel faster than visible light and have a shorter wavelength.

B In a vacuum, microwaves travel at the same speed as visible light and have a shorter wavelength.

C In a vacuum, X-rays travel faster than visible light and have a shorter wavelength.

D In a vacuum, X-rays travel at the same speed as visible light and have a shorter wavelength.

23 What can transmit some types of transverse waves but **not** longitudinal waves?

A air

B a steel bar

C a vacuum

D sea water

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24 What is ultrasound?

A sound waves that are so loud that they damage human hearing

B sound waves that are too high-pitched for humans to hear

C sound waves that are too low-pitched for humans to hear

D sound waves that are too quiet for humans to hear

25 What would be the least successful method of magnetising a steel bar?

A Insert the bar in a coil with a large direct current (d.c.).

B Place the bar at right angles to a weak magnetic field and hit it with a hammer.

C Place the bar parallel to a strong magnetic field, heat it and let it cool.

D Stroke the bar with a magnet.

26 An electric current in a copper wire is due to the flow of charge.

Which particles are moving along the wire?

A α-particles

B copper nuclei

C electrons

D protons

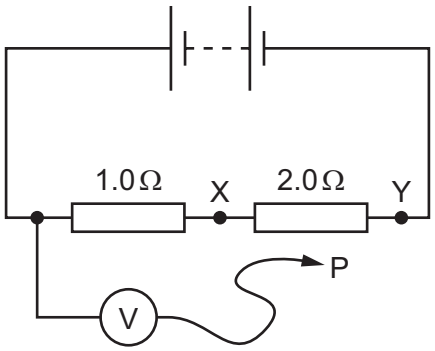
27 Which row correctly shows a conductor and an insulator?

	conductor	insulator
A	rubber	plastic
B	iron	nylon
C	air	wood
D	copper	steel

28 The diagram shows a circuit containing two resistors of resistance 1.0 Ω and 2.0 Ω.

A voltmeter is connected across the 1.0 Ω resistor by connecting P to X.

The reading on the voltmeter is 6.0 V.



P is moved to point Y in the circuit.

What is the new reading on the voltmeter?

A 3.0 V **B** 6.0 V **C** 12 V **D** 18 V

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

A ampere

B newton

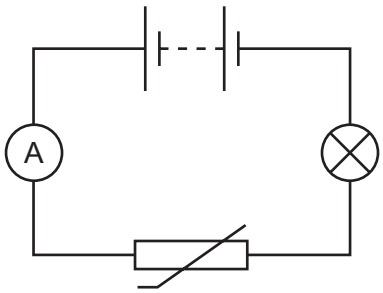
C ohm

D volt

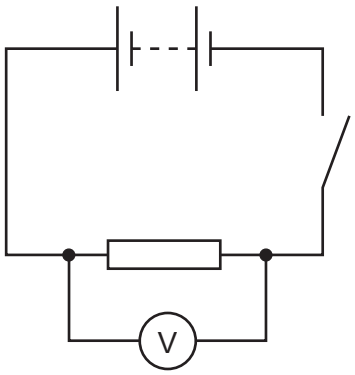
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30 Which circuit contains a fuse?

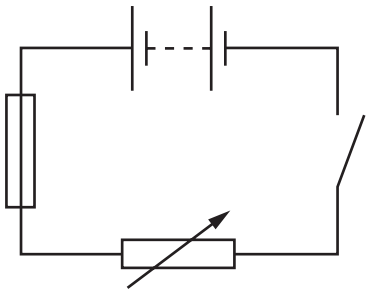
A



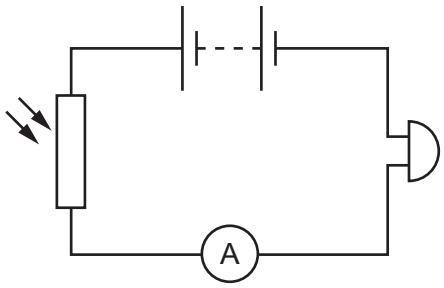
B



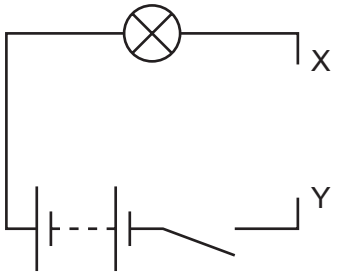
C



D



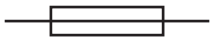
31 A student sets up the circuit shown, with a gap XY.



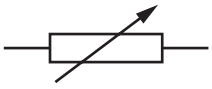
The student wishes to connect a component between X and Y to enable her to vary the brightness of the lamp.

Which component should be used?

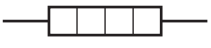
A



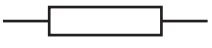
B



C

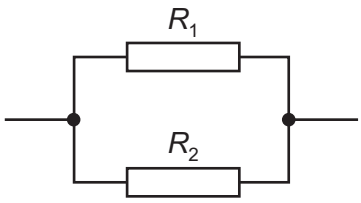


D



32 Two resistors, with resistances R_1 and R_2, are connected in parallel.

The resistance R_1 is greater than the resistance R_2.



What is the resistance of the parallel combination?

A less than either R_1 or R_2

B equal to R_1

C equal to R_2

D the average of R_1 and R_2

33 Circuit breakers and fuses are devices used to protect a circuit from overloading.

Which statement correctly describes the difference between a circuit breaker and a fuse?

A Circuit breakers can be reset if they operate but fuses need to be replaced.

B Circuit breakers need to be replaced if they operate but fuses can be reset.

C Circuit breakers can be used in an a.c. circuit but fuses cannot.

D Circuit breakers cannot be used in an a.c. circuit but fuses can.

34 Why might it be dangerous to use an electrical appliance in damp conditions?

A It might lead to the fuse blowing.

B It might lead to the insulation on the supply cable becoming damaged.

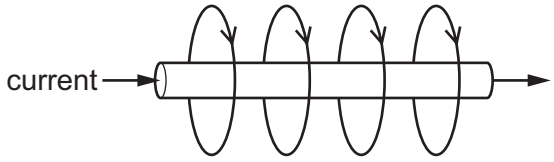
C It might lead to an electric shock.

D It might lead to the supply cable overheating.

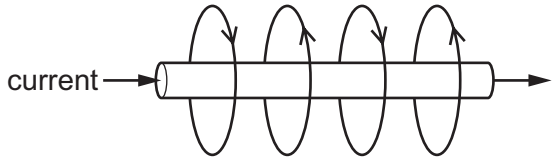
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35 Which diagram shows the magnetic field around a straight, current-carrying wire?

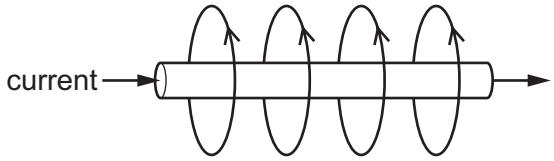
A



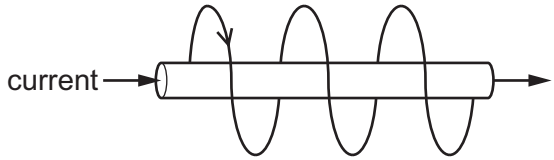
B



C



D



36 When wiring a house, it is important to use the correct cables.

The current ratings of four different cables are listed.

All four cables are used in series in the same circuit.

Which cable is most likely to overheat?

A 6 A **B** 10 A **C** 15 A **D** 30 A

37 A very important experiment improved scientists' understanding of the structure of matter.

The experiment involved α-particles being fired at a thin, gold foil.

What happened?

A All the α-particles were absorbed by the nuclei of the gold atoms.

B All the α-particles were unaffected by the gold atoms.

C Some of the α-particles were attracted by the neutrons in the nuclei of the gold atoms.

D Some of the α-particles were repelled by the protons in the nuclei of the gold atoms.

38 A nuclide has the symbol $^{23}_{11}\text{Na}$.

Which statement about all atoms of this nuclide is correct?

A There are 11 protons in the nucleus.

B There are 23 neutrons in the nucleus.

C There are 11 electrons in the nucleus.

D There are 34 nucleons in the nucleus.

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39 The half-life for lead-202 is 52 500 years.

A sample of lead-202 produces 800 counts / s.

How long will it take for the count rate to drop to 100 counts / s?

A 105 000 years

B 157 500 years

C 210 000 years

D 420 000 years

40 Why is a thick shield made of lead needed to protect people from a source of γ-rays?

A Gamma radiation is strongly ionising and so is not very penetrating.

B Gamma radiation is strongly ionising and so is very penetrating.

C Gamma radiation is weakly ionising and so is not very penetrating.

D Gamma radiation is weakly ionising and so is very penetrating.

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