UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICS **0625/13**

Paper 1 Multiple Choice **May/June 2012**

45 minutes

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

4197283083

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, highlighters, 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.

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.

This document consists of **19** printed pages and **1** blank page.

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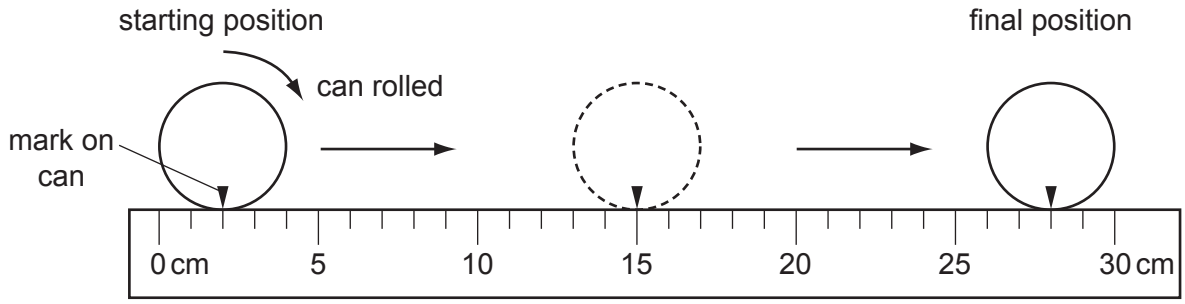
1 A cylindrical can is rolled along the ruler shown in the diagram.



The can rolls over twice.

What is the circumference (distance all round) of the can?

A 13 cm **B** 14 cm **C** 26 cm **D** 28 cm

2 Which quantity is measured in newtons?

A density

B energy

C pressure

D weight

3 In a race, a car travels 60 times around a 3.6 km track. This takes 2.4 hours.

What is the average speed of the car?

A 1.5 km / h **B** 90 km / h **C** 144 km / h **D** 216 km / h

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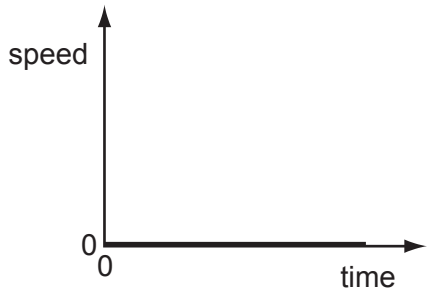
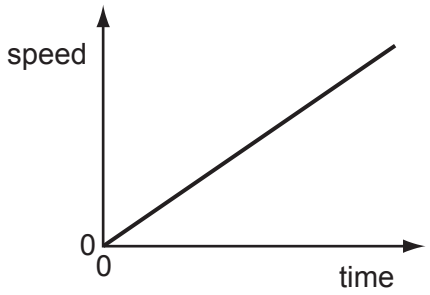
4 A car is moving downhill along a road at a constant speed.

Which graph is the speed / time graph for the car?

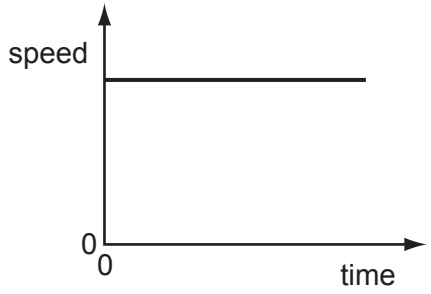
A



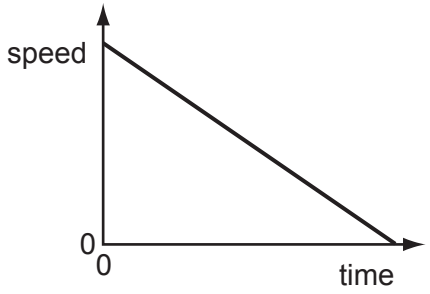
B



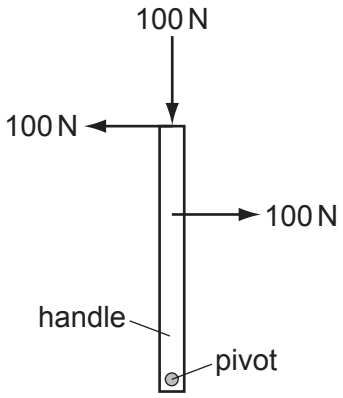
C



D



5 The diagram shows a handle with three forces, each 100 N, applied to it. The handle is free to move.



What is the effect of the forces on the handle?

A The handle will move downwards.

B The handle will not move.

C The handle will turn anticlockwise (to the left).

D The handle will turn clockwise (to the right).

6 A stone has a volume of 0.50 cm^3 and a mass of 2.0 g.

What is the density of the stone?

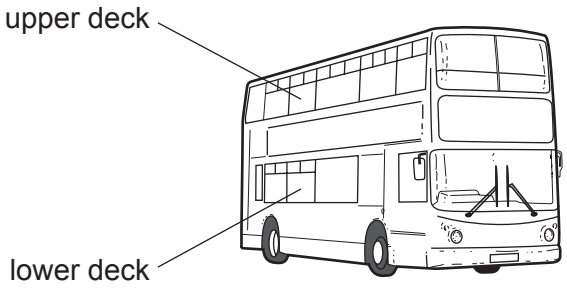
A 0.25 g/cm^3

B 1.5 g/cm^3

C 2.5 g/cm^3

D 4.0 g/cm^3

7 Passengers are **not** allowed to stand on the upper deck of double-decker buses.



Why is this?

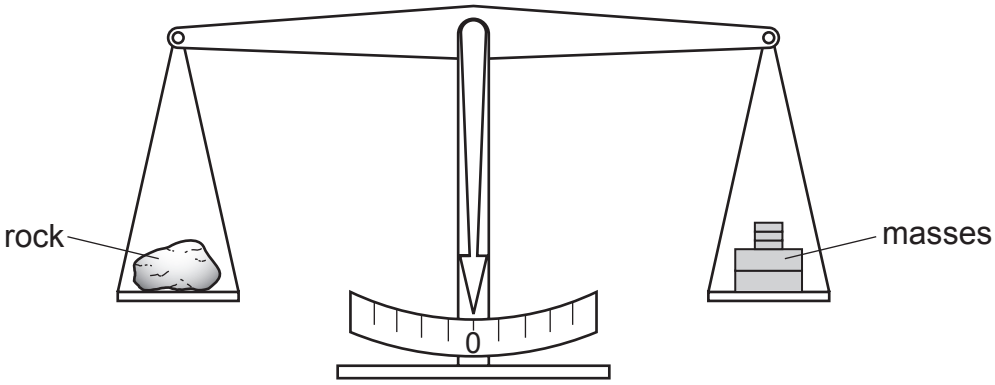
A They would cause the bus to become less stable.

B They would cause the bus to slow down.

C They would increase the kinetic energy of the bus.

D They would lower the centre of mass of the bus.

8 A geologist places a small rock on the left-hand pan of a balance. The two pans are level as shown when masses with a total weight of 23 N are placed on the right-hand pan.
Take the weight of 1.0 kg to be 10 N.



What is the mass of the small rock?

A 0.023 kg **B** 2.3 kg **C** 23 kg **D** 230 kg

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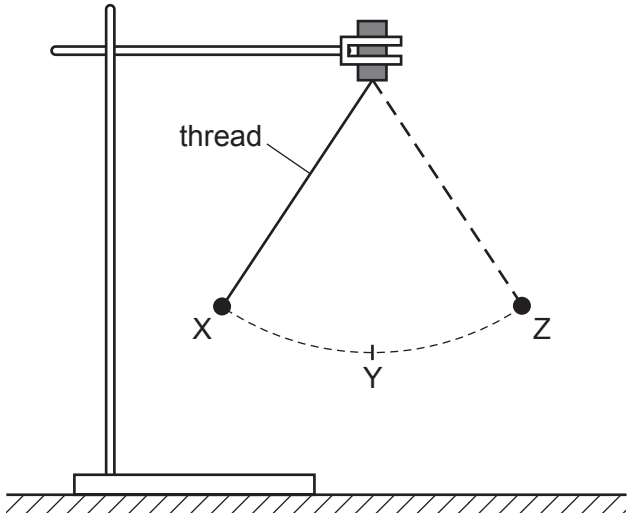
9 An object on a thread is swinging between X and Z, as shown in the diagram. It is momentarily at rest at X and at Z.



An incomplete word equation about the energy of the object is shown below.

gravitational potential energy at X = kinetic energy at Y + …… energy at Y + energy losses

Which form of energy is needed to complete the word equation?

A chemical

B gravitational potential

C internal

D strain

10 Which pair contains **only** physical quantities that vary with temperature and so could be used in making a thermometer?

A activity of a radioactive source, volume of a gas

B mass of a liquid, volume of a liquid

C activity of a radioactive source, mass of a solid

D volume of a gas, volume of a liquid

11 The molecules of a substance become more closely packed and move more quickly.

What is happening to the substance?

A A gas is being heated and compressed.

B A gas is being heated and is expanding.

C A liquid is boiling.

D A liquid is evaporating at room temperature.

12 Why does convection take place in a liquid when it is heated?

A Liquids expand when they are heated.

B Liquids start to bubble when they get close to boiling point.

C Molecules in the liquid expand when they are heated.

D Molecules near to the surface of the liquid escape into the air.

13 In which pair of energy sources are both sources renewable?

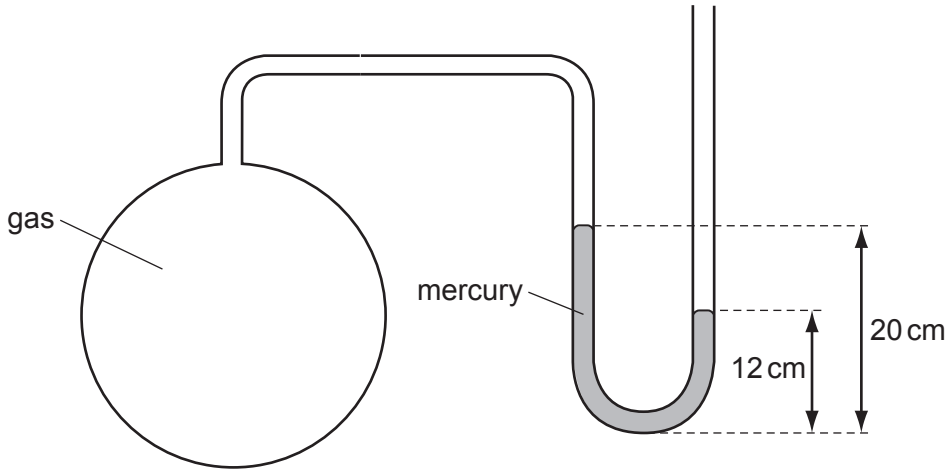
A oil and coal

B oil and tidal

C tidal and geothermal

D tidal and nuclear fission

14 The diagram shows a mercury manometer used to measure the pressure of gas in a container. Atmospheric pressure is 76 cm of mercury.



What is the pressure of the gas?

A 56 cm of mercury

B 68 cm of mercury

C 84 cm of mercury

D 96 cm of mercury

15 Which statement is explained by reference to pressure?

A Objects with greater mass have greater weight.

B One kilogram of water occupies more volume than one kilogram of lead.

C Spikes on running-shoes sink into the ground.

D Water cooled to a low enough temperature turns to ice.

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16 Brownian motion is observed when looking at smoke particles in air using a microscope.

What causes the smoke particles to move at random?

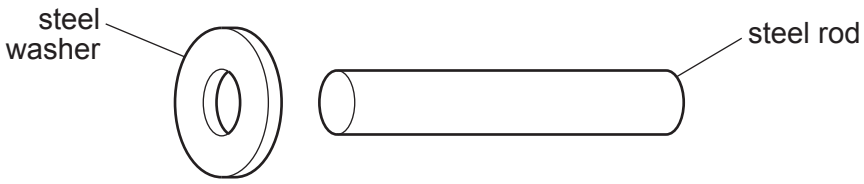
A Smoke particles are hit by air molecules.

B Smoke particles are moved by convection currents in the air.

C Smoke particles have different weights and fall at different speeds.

D Smoke particles hit the walls of the container.

17 An engineer wants to fix a steel washer on to a steel rod. The rod is just too big to fit into the hole of the washer.



How can the engineer fit the washer on to the rod?

A Cool the washer and put it over the rod.

B Cool the washer and rod to the same temperature and push them together.

C Heat the rod and then place it in the hole.

D Heat the washer and then place it over the rod.

18 A heater supplies 80 J of energy to a block of metal. The temperature of the block rises by 20 °C.

What happens to the block of metal when its temperature falls by 10 °C?

A Its internal energy decreases by 40 J.

B Its internal energy decreases by 160 J.

C Its internal energy increases by 40 J.

D Its internal energy increases by 160 J.

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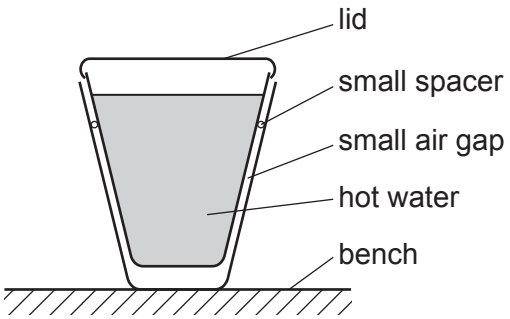
19 Two plastic cups are placed one inside the other. Hot water is poured into the inner cup and a lid is put on top, as shown.



Which statement is correct?

A Heat loss by radiation is prevented by the small air gap.

B No heat passes through the sides of either cup.

C The bench is heated by convection from the bottom of the outer cup.

D The lid is used to reduce heat loss by convection.

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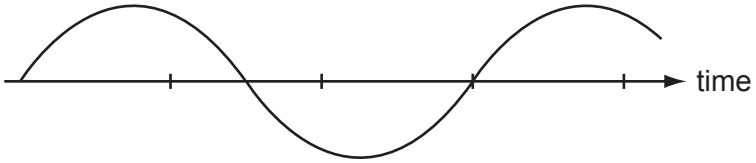
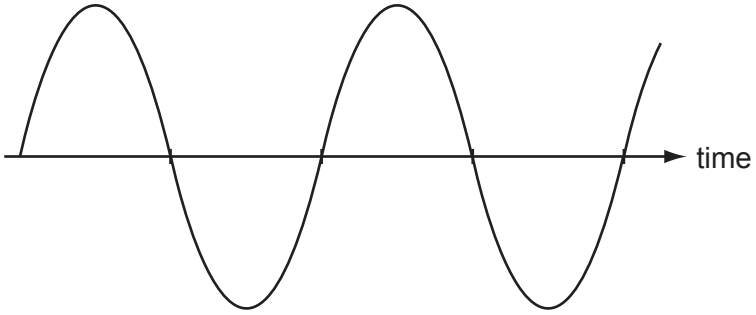
20 The diagrams represent the waves produced by four sources of sound. The scales are the same for all the diagrams.

Which sound has the highest frequency?

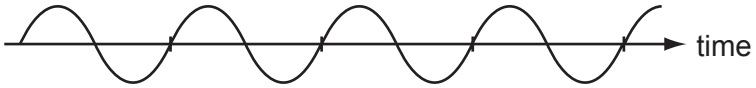
A



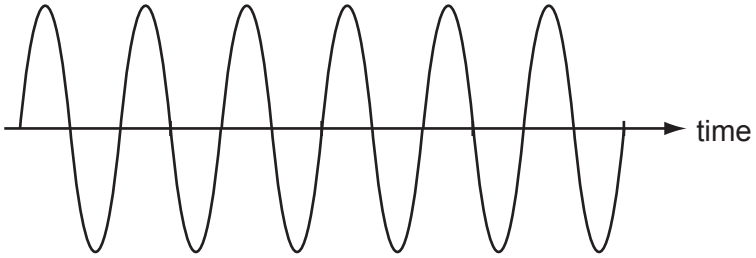
B



C

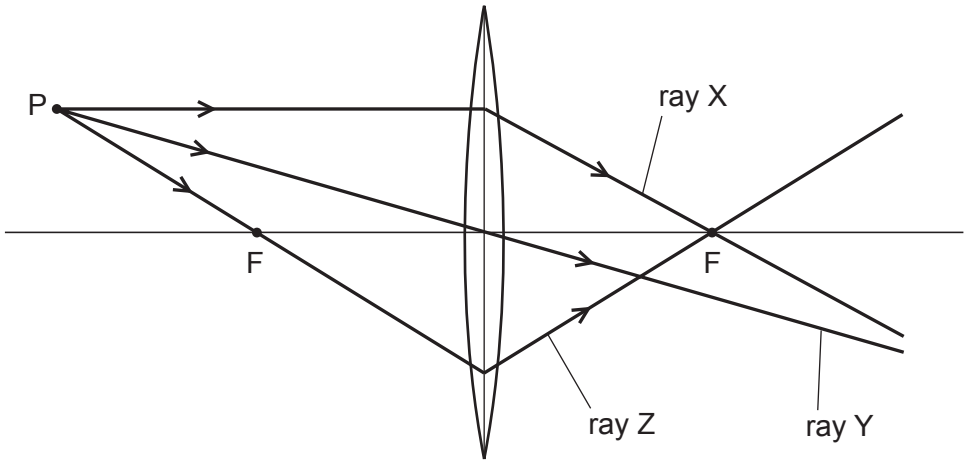


D



21 A student draws three rays of light from point P through a converging lens.

Each point labelled F is a principal focus of the lens.



Which of the rays are drawn correctly?

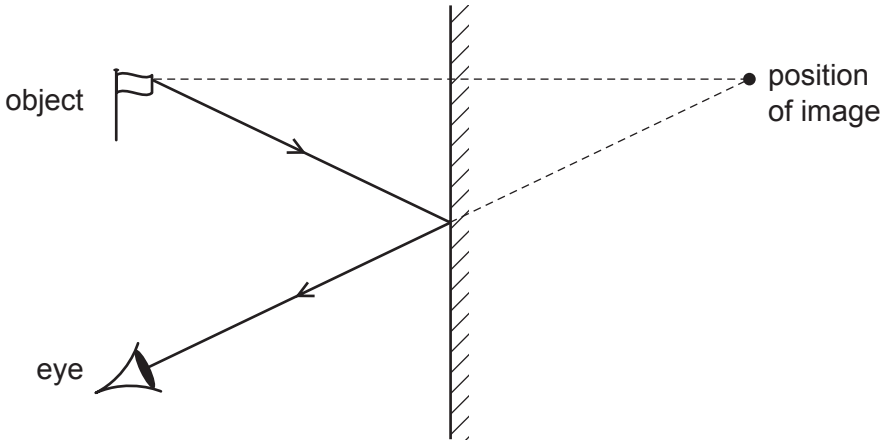
A ray Y only

B ray Z only

C ray X and ray Y

D ray X and ray Z

22 The image formed by a plane mirror is upright.



What are the other characteristics of the image?

	laterally inverted (left to right)	magnified (larger than the object)	virtual
A	no	yes	yes
B	yes	no	no
C	yes	no	yes
D	yes	yes	no

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23 Which row correctly describes light waves and radio waves?

	light waves	radio waves
A	longitudinal	longitudinal
B	longitudinal	transverse
C	transverse	longitudinal
D	transverse	transverse

24 What is the unit of wavelength?

A hertz

B metre

C metre per second

D second

25 A girl stands at a distance from a large building. She claps her hands and a short time later hears an echo.

Why is an echo produced when the sound waves hit the building?

A The sound waves are absorbed.

B The sound waves are diffracted.

C The sound waves are reflected.

D The sound waves are refracted.

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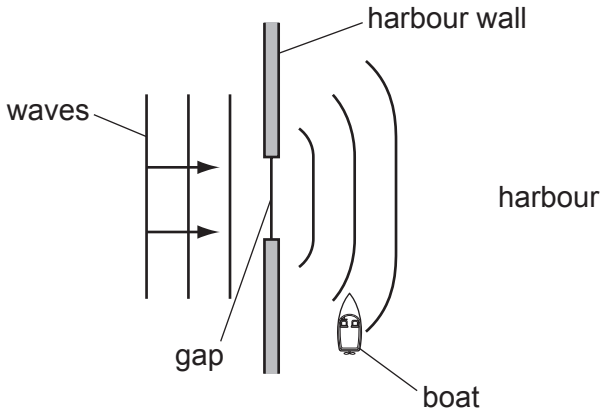
26 The diagram shows water waves passing through a gap in a harbour wall. The waves curve round the wall and reach a small boat in the harbour.



What is the name of this curving effect, and how can the gap be changed so that the waves are less likely to reach the boat?

	name of effect	change to the gap
A	diffraction	make the gap slightly bigger
B	diffraction	make the gap slightly smaller
C	refraction	make the gap slightly bigger
D	refraction	make the gap slightly smaller

27 A thermistor is used in a circuit to control a piece of equipment automatically.

What might this circuit be used for?

A lighting an electric lamp as it becomes darker

B ringing an alarm bell if a locked door is opened

C switching on a water heater at a pre-determined time

D turning on an air conditioner when the temperature rises

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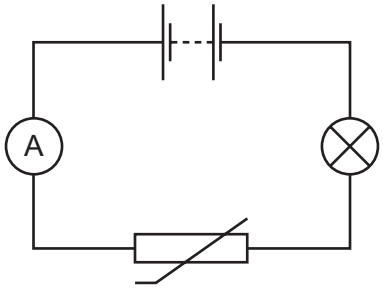
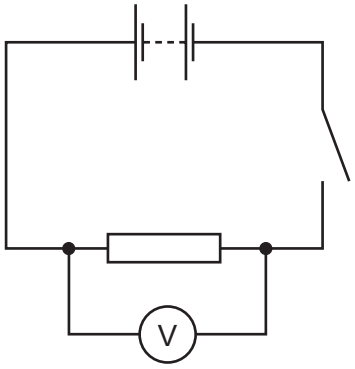
28 Which circuit contains a fuse?

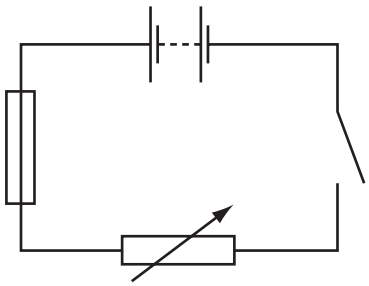
A



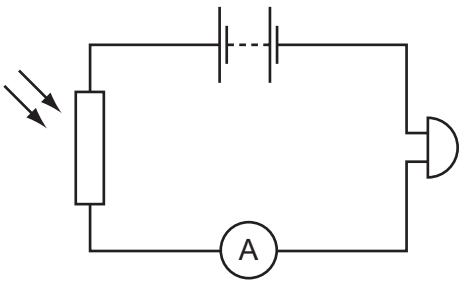
B



C



D



29 In which unit is potential difference measured?

A ampere

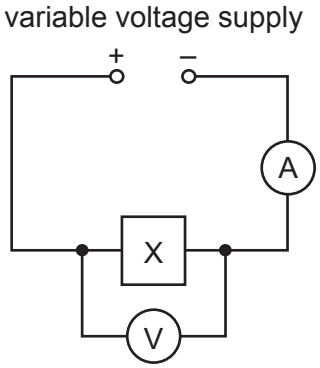
B ohm

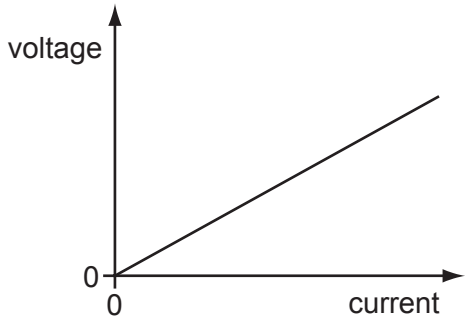
C volt

D watt

30 The circuit shown in the diagram contains an unknown component X, hidden in a box.

The voltage-current graph for X is as shown.





What is the component X?

A a capacitor

B a closed switch

C an open switch

D a resistor of constant resistance

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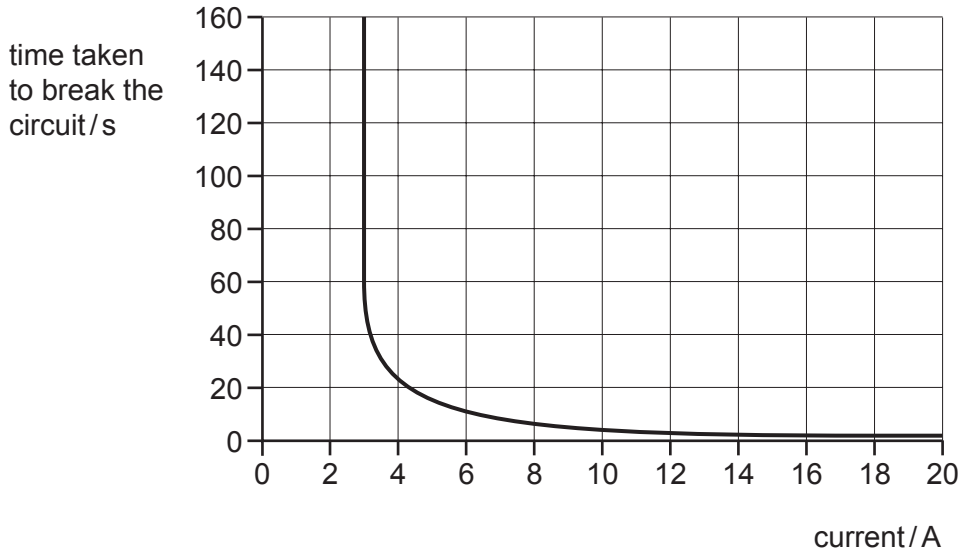
31 A circuit-breaker is designed to protect a circuit which usually carries a current of 2 A.

The time taken to break the circuit depends on the current, as shown in the graph.



What happens when the current in the circuit is 2 A and what happens when the current 18 A?

	when the current is 2 A	when the current is 18 A
A	the circuit breaks in less than 5 seconds	the circuit breaks in less than 5 seconds
B	the circuit breaks in less than 5 seconds	the circuit does not break
C	the circuit does not break	the circuit breaks in less than 5 seconds
D	the circuit does not break	the circuit does not break

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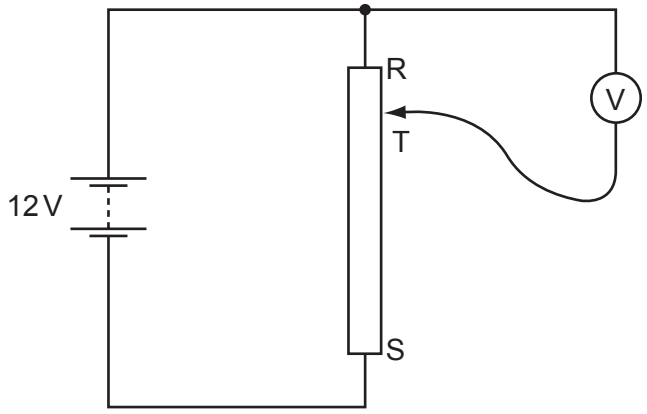
32 A student connects a variable potential divider (potentiometer) circuit.



What happens to the reading on the voltmeter as the sliding terminal T is moved from R to S?

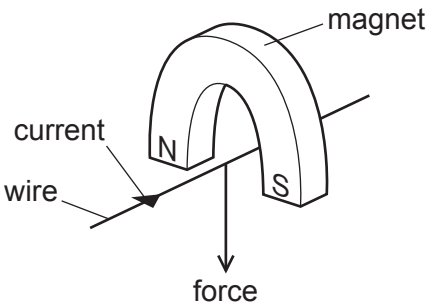
A It decreases from 12 V to 0 V.

B It increases from 0 V to 12 V.

C It remains at 0 V.

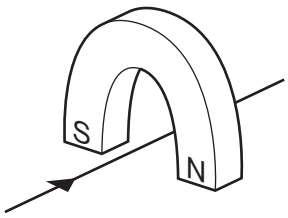
D It remains at 12 V.

33 A wire passes between the poles of a horseshoe magnet. There is a current in the wire in the direction shown, and this causes a force to act on the wire.



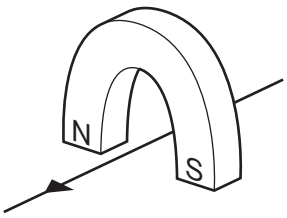
Three other arrangements, P, Q and R, of the wire and magnet are set up as shown.

P



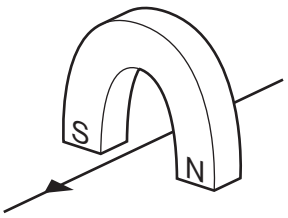
magnet turned around

Q



current direction reversed

R



current direction reversed and magnet turned around

Which arrangement or arrangements will cause a force in the same direction as the original arrangement?

A P, Q and R **B** P and Q only **C** P only **D** R only

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34 Which statement describes a property of a magnet?

A It attracts ferrous materials.

B It could have only one pole (north or south).

C It points in a random direction when suspended.

D It repels non-ferrous materials.

35 Which procedure may be used to demagnetise a steel bar?

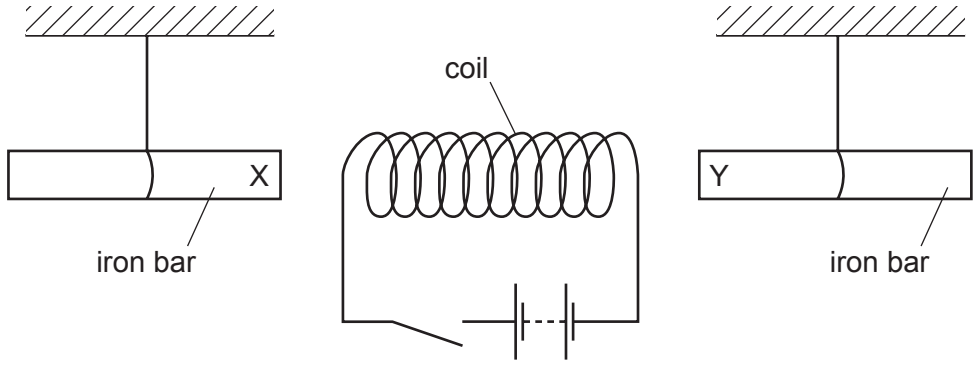
A cooling it in a freezer

B earthing it with a copper wire

C placing it in a solenoid carrying a large direct current (d.c.)

D striking it repeatedly with a hammer

36 The diagram shows a coil connected to a battery and a switch. Two unmagnetised iron bars hang freely near opposite ends of the coil.



What happens to the iron bars when the switch is closed?

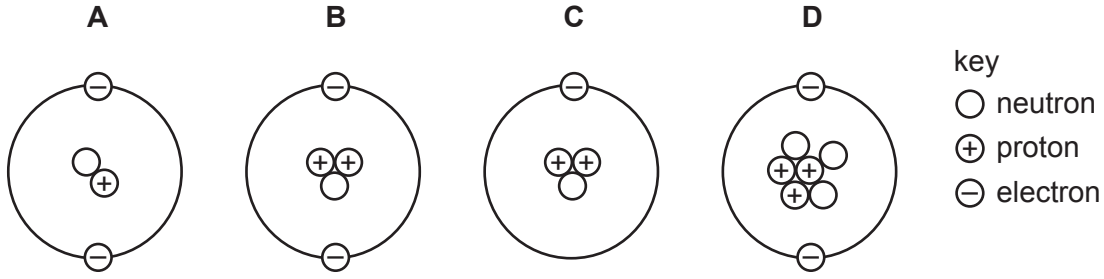
A Both X and Y move away from the coil.

B Both X and Y move towards the coil.

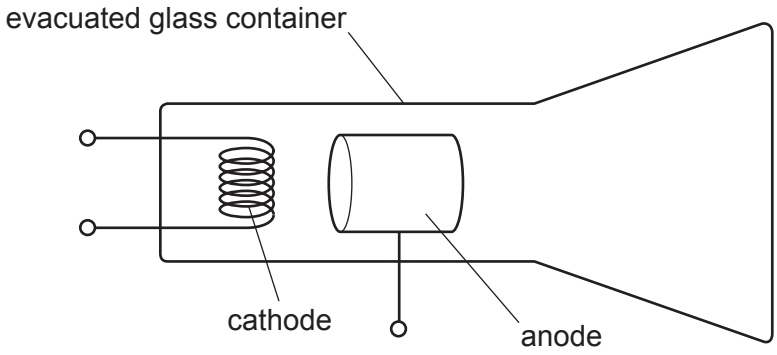
C X moves towards the coil, Y moves away from the coil.

D Y moves towards the coil, X moves away from the coil.

37 Which diagram could represent the structure of a neutral atom?



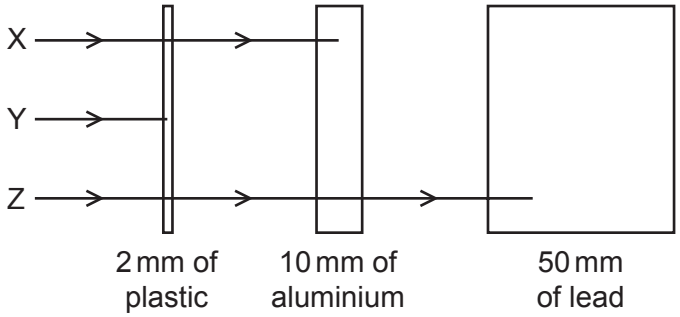
38 The diagram shows a device to produce cathode rays.



Which part of the device is heated and why?

	part heated	reason
A	anode	to emit electrons
B	anode	to emit protons
C	cathode	to emit electrons
D	cathode	to emit protons

39 The diagram shows the paths of three different types of radiation, X, Y and Z.



Which row in the table correctly identifies X, Y and Z?

	X	Y	Z
A	α-particles	β-particles	γ-rays
B	β-particles	α-particles	γ-rays
C	β-particles	γ-rays	α-particles
D	γ-rays	α-particles	β-particles

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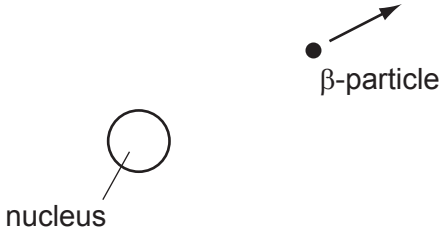
40 A radioactive nucleus emits a β-particle.



What happens to the proton number (atomic number) of the nucleus?

A It stays the same.

B It increases by 1.

C It decreases by 2.

D It decreases by 4.

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