UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

PHYSICAL SCIENCE **0652/01**

Paper 1 Multiple Choice **October/November 2009**

45 minutes

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

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.

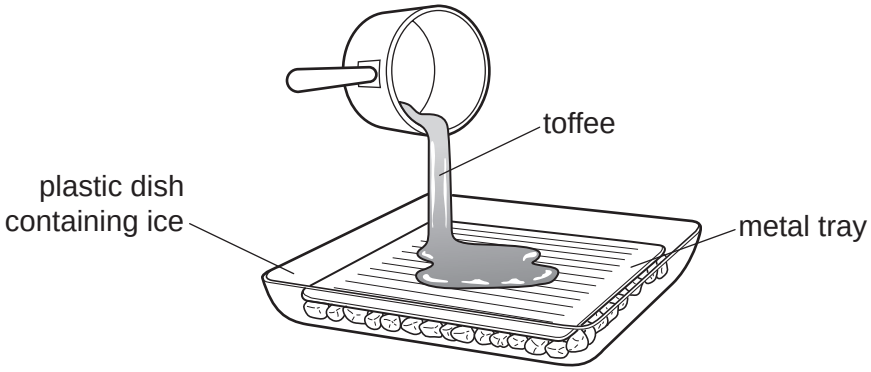
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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.
A copy of the Periodic Table is printed on page 20.

This document consists of **17** printed pages and **3** blank pages.

1 Which statement explains why toffee can move and change its shape while it is a liquid but **not** when it is cooled and solid?



A The particles in a liquid are much further apart than those in a solid.

B The particles in a liquid are separate but a solid is one large particle.

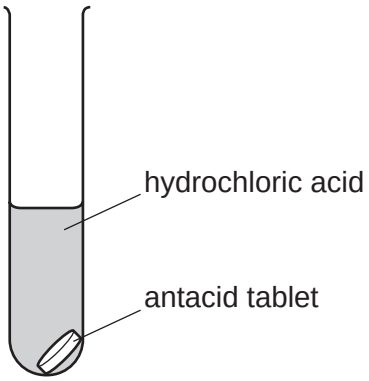
C The particles in a liquid can move past each other but are fixed in place in a solid.

D The particles in a liquid change shape when it becomes a solid.

2 Antacid tablets react with hydrochloric acid in the stomach to form carbon dioxide gas.

A series of experiments is carried out to find the rates at which tablets react with samples of hydrochloric acid at different temperatures.

In each experiment, one tablet is added to 100 cm^3 of 1 mol / dm^3 hydrochloric acid. The time taken for the tablet to disappear completely is noted.



Which pieces of apparatus, other than the test-tube, are needed for these experiments?

A balance, measuring cylinder and stopwatch

B balance, measuring cylinder and thermometer

C balance, stopwatch and thermometer

D measuring cylinder, stopwatch and thermometer

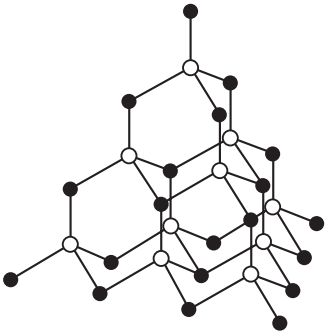
3 The table shows the nucleon numbers and proton numbers of some atoms.

nucleon number	35	37	40	39	40
proton number	17	17	18	19	19

How many are atoms of non-metallic elements?

A 1 **B** 2 **C** 3 **D** 4

4 The compound silicon carbide, SiC, has the structure shown.



key

● carbon, C

○ silicon, Si

It can be predicted from this structure that silicon carbide might be used ……1…… because its structure is similar to that of ……2…… .

Which words complete gaps 1 and 2?

	1	2
A	as a lubricant	diamond
B	as a lubricant	graphite
C	in cutting	diamond
D	in cutting	graphite

5 A molecule of compound X contains the following.

2 atoms of carbon, C

2 atoms of oxygen, O

4 atoms of hydrogen, H

What is the formula of X?

A $(CH_2)_2O$ **B** $(CH_2)_2O_2$ **C** $C_2(OH)_4$ **D** C_4H_2O

6 Hydrogen is used as a fuel. This is because its ……1…… is an ……2…… reaction.

Which words correctly complete gaps 1 and 2?

	1	2
A	oxidation	endothermic
B	oxidation	exothermic
C	reduction	endothermic
D	reduction	exothermic

7 How can the speed of reaction between lumps of zinc and dilute hydrochloric acid be slowed down?

A Add water to the acid.

B Increase the temperature.

C Make the acid more concentrated.

D Powder the lumps of zinc.

8 Which reaction results in the formation of a salt?

A acid + metal carbonate

B acid + non-metal oxide

C base + metal carbonate

D base + metal oxide

9 An alkaline gas is given off when a compound is heated with aqueous sodium hydroxide.

Which ion is present in the compound?

A aluminium

B ammonium

C calcium

D zinc

10 A solution is made by adding sodium oxide to water.

Which pH change will occur?

A 1 to 7 **B** 7 to 1 **C** 7 to 12 **D** 12 to 7

11 The table shows some properties of elements P and Q.

	P	Q
has a coloured oxide	✓	✓
oxide can be reduced by carbon	✓	✓
reacts with dilute sulfuric acid	✗	✓

What are elements P and Q?

	P	Q
A	Cu	Fe
B	Cu	Zn
C	Fe	Cu
D	Fe	Zn

12 The table gives the arrangement of electrons in the atoms of four elements.

Which element does **not** form an ionic compound?

element	arrangement of electrons
A	2, 7
B	2, 8
C	2, 8, 1
D	2, 8, 2

13 Astatine is the element below iodine in Group VII of the Periodic Table.

What can be predicted about the properties of astatine at room temperature?

A It is a liquid.

B It is a metal.

C It is a solid.

D It is white.

14 Metal X is below hydrogen in the reactivity series.

Which row in the table is correct?

	reaction of X with hydrochloric acid	reaction of the heated oxide of X with carbon
A	hydrogen formed	metal formed
B	hydrogen formed	no reaction
C	no reaction	metal formed
D	no reaction	no reaction

15 What is the main reason why stainless steel is used for cutlery?

A It has a high electrical conductivity.

B It has a low melting point.

C It is of low density.

D It is resistant to corrosion.

16 The equation describes a reaction which occurs in a blast furnace.

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

Which substance is reduced?

A carbon dioxide

B carbon monoxide

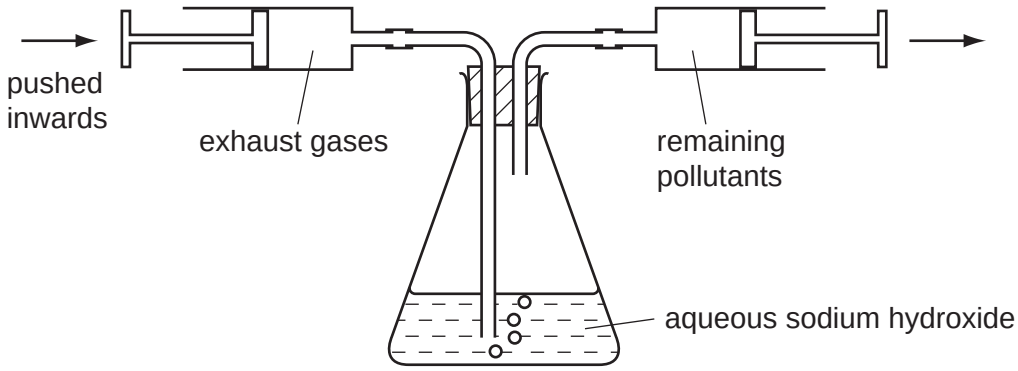
C iron

D iron(III) oxide

17 Exhaust gases contain the pollutants CO, NO_2 and SO_2.

To remove any acidic gas, the gases are passed through the apparatus shown.

The remaining gas is collected in the right-hand syringe.



What happens to the pH of the aqueous sodium hydroxide and what could the remaining gas contain?

	pH of aqueous sodium hydroxide	gas in right-hand syringe contains
A	decreases	CO only
B	decreases	CO and NO_2 only
C	increases	CO only
D	increases	CO and SO_2 only

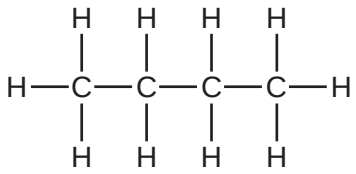
18 Lime is used to treat industrial waste products.

Which pH change occurs in this treatment?

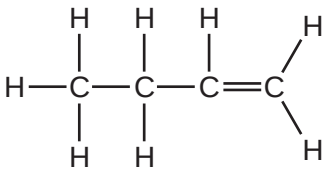
A 2 to 7 **B** 7 to 2 **C** 9 to 7 **D** 9 to 2

19 Which of the compounds shown is **not** an alkane?

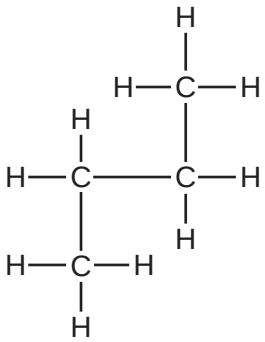
A



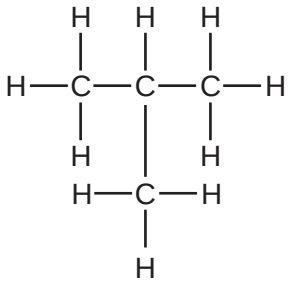
B



C



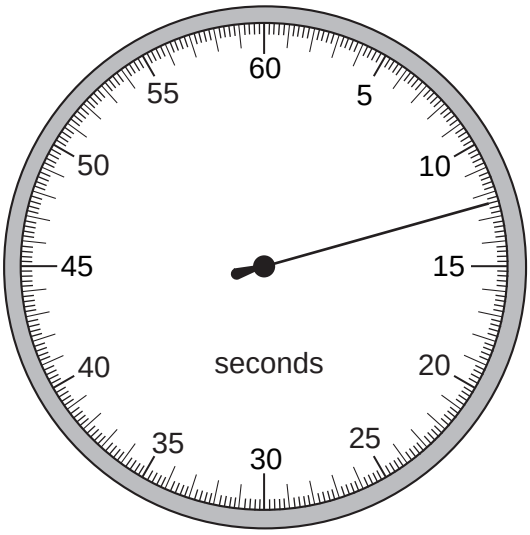
D



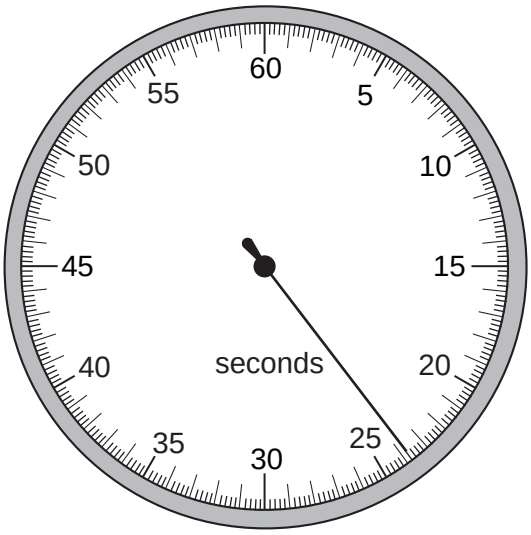
20 Which row in the table is correct for decane?

	burns	is saturated
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

21 A stopwatch is used to time an athlete running 100 m. The timekeeper forgets to reset the watch to zero before using it to time another athlete running 100 m.



stopwatch at end of first athlete's run

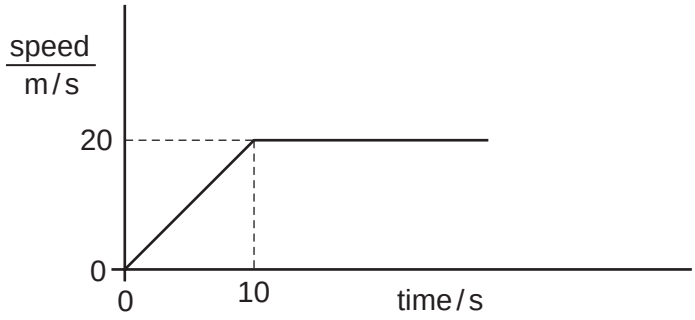


stopwatch at end of second athlete's run

How long does the second athlete take to run 100 m?

A 11.2 s **B** 11.4 s **C** 12.4 s **D** 23.8 s

22 A car accelerates from traffic lights. The graph shows the car's speed plotted against time.



How far does the car travel before it reaches a constant speed?

A 10 m **B** 20 m **C** 100 m **D** 200 m

23 Which property of a body can be measured in newtons?

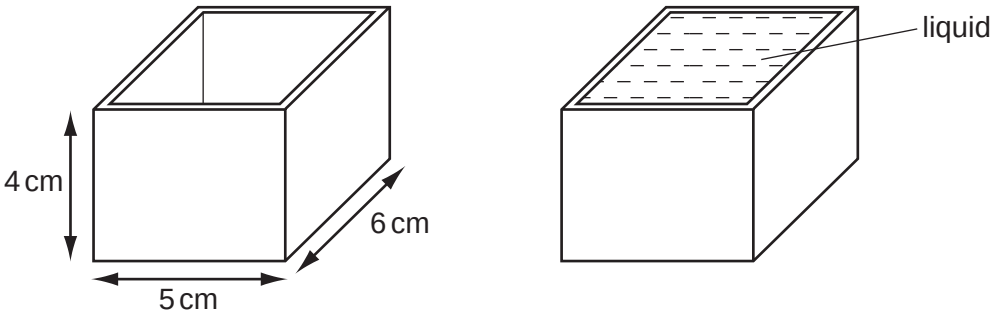
A density

B mass

C volume

D weight

24 The diagrams show a rectangular box with inside measurements of 5 cm × 6 cm × 4 cm.



The box has a mass of 40 g when empty. When filled with a liquid it has a total mass of 220 g.

What is the density of the liquid?

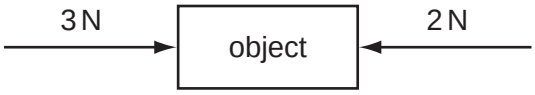
A $\frac{220}{(5\times6\times4)}\,g/cm^3$

B $\frac{(220-40)}{(5\times6\times4)}\,g/cm^3$

C $\frac{(5\times6\times4)}{220}\,g/cm^3$

D $\frac{(5\times6\times4)}{(220-40)}\,g/cm^3$

25 The object in the diagram is acted upon by the two forces shown.



What is the effect of these forces?

A The object moves to the left with constant speed.

B The object moves to the left with constant acceleration.

C The object moves to the right with constant speed.

D The object moves to the right with constant acceleration.

26 To mark a temperature scale on a thermometer, standard temperatures known as fixed points are needed.

Which of these is a fixed point?

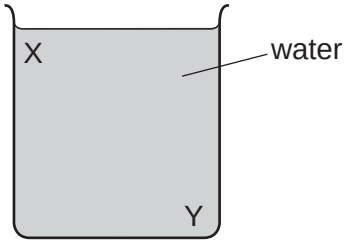
A room temperature

B the temperature inside a freezer

C the temperature of pure melting ice

D the temperature of pure warm water

27 A beaker contains water at room temperature.



How could a convection current be set up in the water?

A cool the water at X

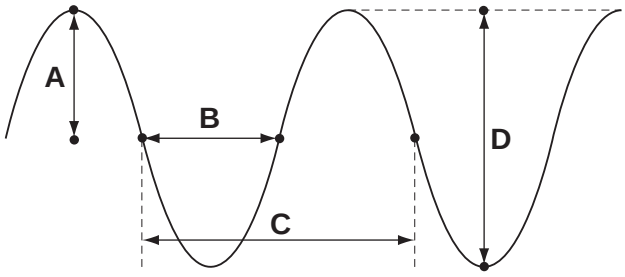
B cool the water at Y

C stir the water at X

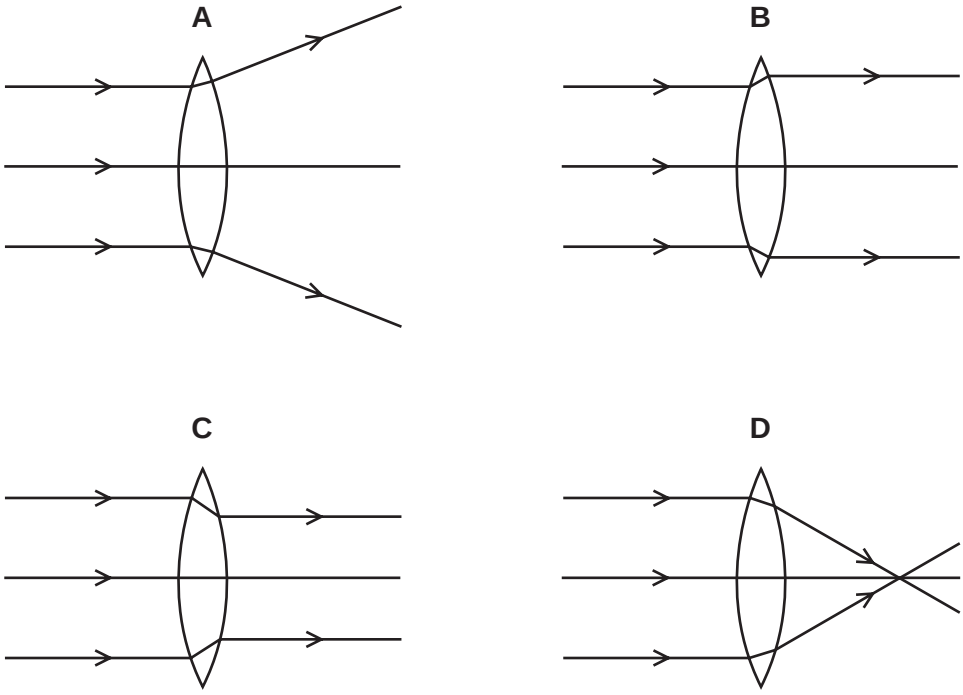
D stir the water at Y

28 The diagram shows a wave.

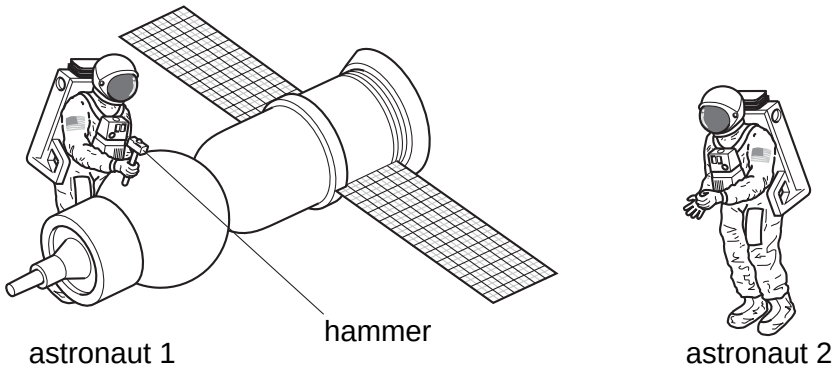
Which labelled distance is the wavelength?



29 Which diagram shows the effect of a thin converging lens on a beam of light?



30 Astronaut 1 uses a hammer to mend a satellite in space. Astronaut 2 is nearby. There is no air in space.



Compared with the sound heard if they were working on Earth, what does astronaut 2 hear?

A a louder sound

B a quieter sound

C a sound of the same loudness

D no sound at all

31 A permanent magnet is brought near to a piece of copper. The copper is not attracted by the magnet.

Why is there no attraction?

A Copper is ferrous but is only attracted by an electromagnet.

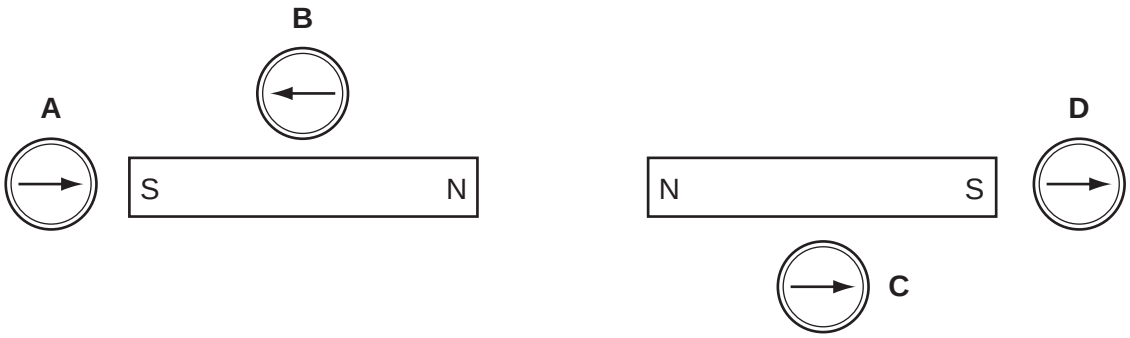
B Copper is ferrous but is not attracted by any type of magnet.

C Copper is not ferrous and is only attracted by an electromagnet.

D Copper is not ferrous and is not attracted by any type of magnet.

32 Four plotting compasses are placed in the magnetic field of two identical bar magnets as shown in the diagram.

Which compass is shown pointing in the wrong direction?



33 A student uses a length of wire as a resistor. He discovers that the resistance of the wire is too small.

To be certain of making a resistor of higher value, he should use a piece of wire that is

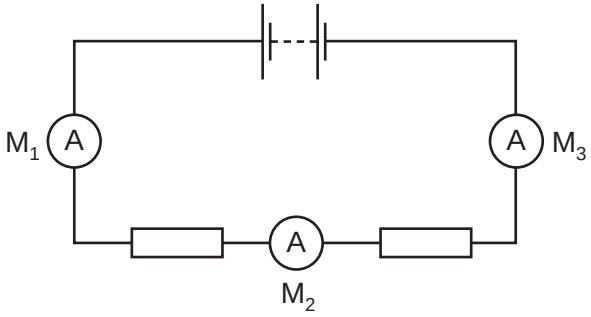
A longer and thicker.

B longer and thinner.

C shorter and thicker.

D shorter and thinner.

34 The diagram shows a battery connected to two identical resistors. Three ammeters M_1, M_2 and M_3 are connected in the circuit.

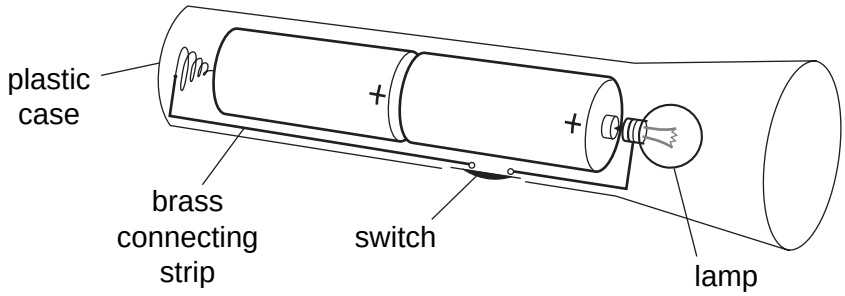


Meter M_1 reads 1.0 A.

What are the readings on M_2 and M_3?

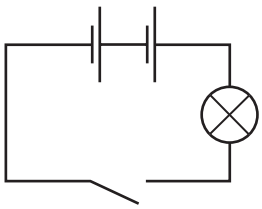
	reading on M_2 / A	reading on M_3 / A
A	0.5	0.0
B	0.5	0.5
C	0.5	1.0
D	1.0	1.0

35 The diagram shows a torch containing two cells, a switch and a lamp.

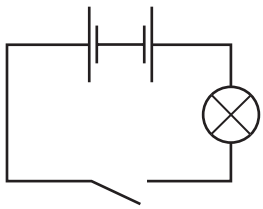


What is the circuit diagram for the torch?

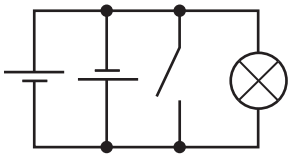
A



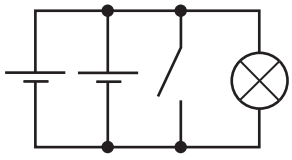
B



C



D



36 On a building site, the metal scaffolding is firmly embedded in the damp ground. A builder holds a mains-operated electric drill in one hand, and with his other hand holds on to the scaffolding.

The power cable of the drill is damaged where it enters the metal casing of the drill.

What danger does this present to the builder?

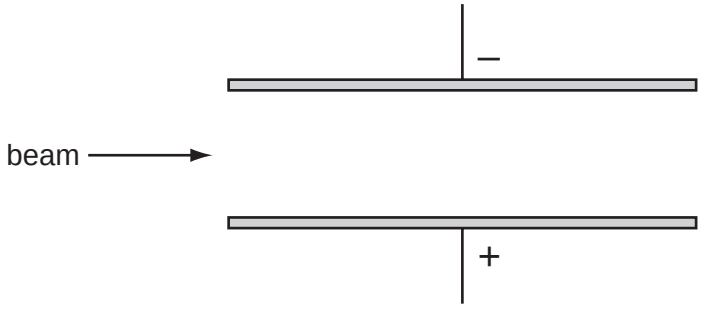
A A current could flow through the builder and electrocute him.

B A current in the scaffolding could heat it up and burn him.

C The large current could blow the fuse and damage the drill.

D The large current could make the motor spin too quickly.

37 The diagram shows a beam of cathode rays entering an electric field.



In which direction is the beam deflected by the field?

A downwards

B upwards

C into the page

D out of the page

38 Which statement explains the meaning of the half-life of a radioactive substance?

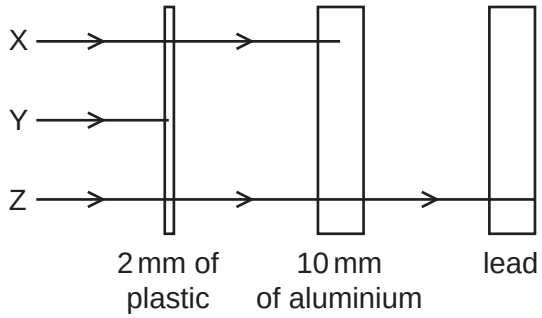
A half the time taken for half the substance to decay

B half the time taken for the substance to decay completely

C the time taken for half the substance to decay

D the time taken for the substance to decay completely

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	alpha-particles	beta-particles	gamma-rays
B	beta-particles	alpha-particles	gamma-rays
C	beta-particles	gamma-rays	alpha-particles
D	gamma-rays	alpha-particles	beta-particles

40 How many neutrons and how many protons are contained in the nuclide $^{238}_{92}U$?

	neutrons	protons
A	92	146
B	146	92
C	146	238
D	238	92

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DATA SHEET
The Periodic Table of the Elements

Group																	
I	II										III	IV	V	VI	VII	0
																4 He Helium 2
					1 H Hydrogen 1											
7 Li Lithium 3	9 Be Beryllium 4										11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12										27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

*58-71 Lanthanoid series
†90-103 Actinoid series

Key: a = relative atomic mass; X = atomic symbol; b = proton (atomic) number

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).