Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/11**

Paper 1 Multiple Choice (Core) **October/November 2018**

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, 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.
DO **NOT** WRITE IN ANY BARCODES.

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 16.
Electronic calculators may be used.

1 Which is a characteristic of all living things?

A a heart

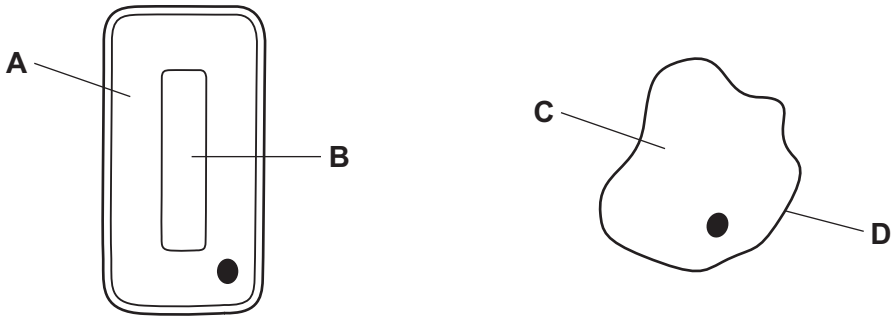
B breathing

C excretion

D sexual reproduction

2 The diagram shows two cells.

Which labelled part might contain chloroplasts?



3 Some bacteria live in acidic, hot springs.

What are the optimum conditions for the enzymes of these bacteria?

A 20 °C and pH 4

B 20 °C and pH 9

C 80 °C and pH 4

D 80 °C and pH 9

4 Glycerol is a component of which large molecules?

A fats

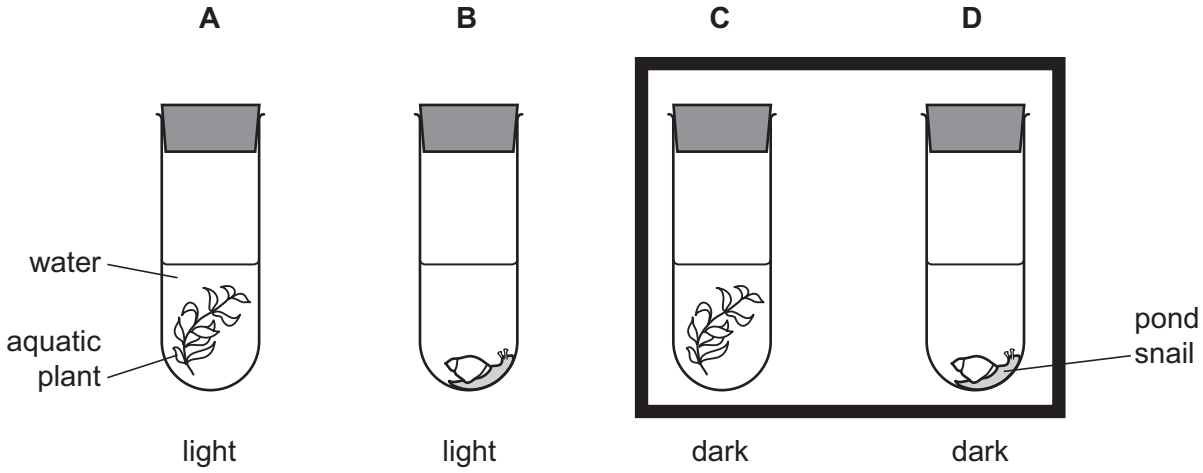
B glycogen

C proteins

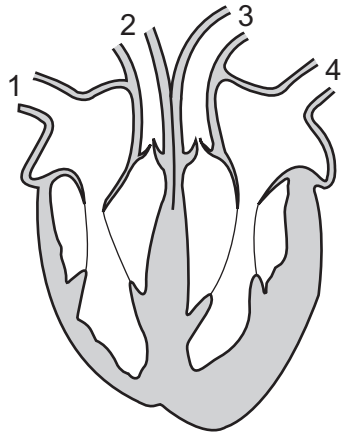
D starch

5 Four test-tubes were set up as shown in the diagram.

Which test-tube will contain the most dissolved oxygen after 24 hours?



6 The diagram shows the heart and the main blood vessels to and from the heart.



What are these blood vessels?

	1	2	3	4
A	pulmonary vein	aorta	pulmonary artery	vena cava
B	pulmonary vein	vena cava	pulmonary artery	aorta
C	vena cava	pulmonary artery	aorta	pulmonary vein
D	vena cava	pulmonary vein	aorta	pulmonary artery

[Turn over

7 In aerobic respiration, which substances are produced and which substances are used?

	produced	used
A	carbon dioxide and glucose	oxygen and water
B	carbon dioxide and water	oxygen and glucose
C	oxygen and glucose	carbon dioxide and water
D	oxygen and water	carbon dioxide and glucose

8 A person touches a hot object and pulls their hand away. This is a reflex action.

Which is the correct pathway?

A stimulus → motor neurone → relay neurone → sensory neurone → response

B stimulus → relay neurone → motor neurone → sensory neurone → response

C stimulus → sensory neurone → relay neurone → motor neurone → response

D stimulus → sensory neurone → motor neurone → relay neurone → response

9 To which environmental stimulus is a plant root responding when it grows downwards?

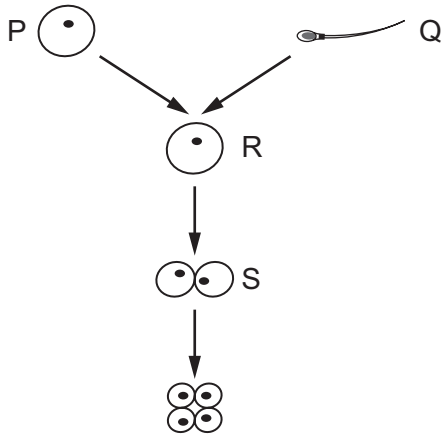
A a decrease in soil water content

B light falling on the leaves of the plant

C rising temperature

D the force of gravity

10 The diagram shows the fusion of two gametes and division of the resulting cell.



Which row describes the nuclei of these cells?

	P	Q	R	S
A	diploid	diploid	diploid	haploid
B	diploid	diploid	haploid	haploid
C	haploid	haploid	diploid	diploid
D	haploid	haploid	haploid	diploid

11 What contains **only** the information to produce a specific protein?

A chromosome

B cytoplasm

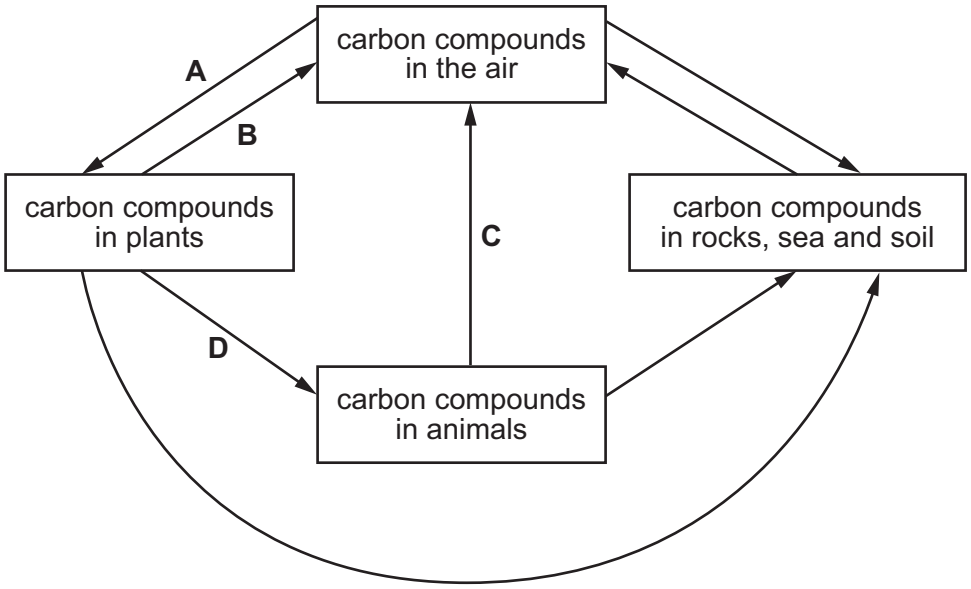
C gene

D nucleus

[Turn over

12 The diagram shows part of the carbon cycle.

Which arrow represents plant respiration?



13 What is **not** an effect of deforestation?

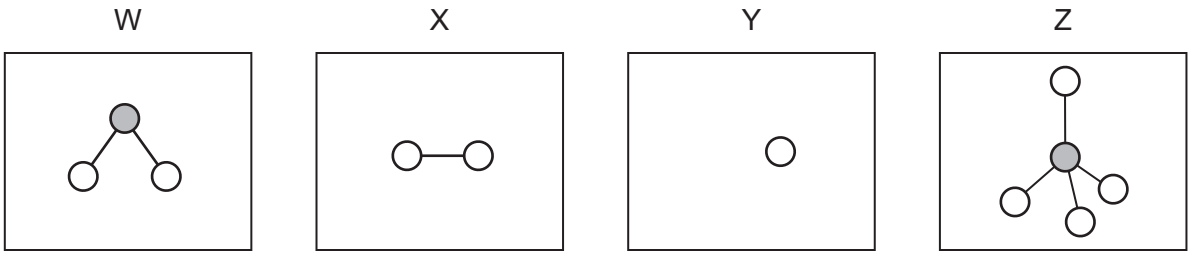
A carbon dioxide build-up in the atmosphere

B habitat loss

C soil loss

D species conservation

14 W, X, Y and Z are diagrams representing atoms and molecules.



Which statement is correct?

A W and Z are molecules and X and Y are atoms.

B W, X and Z are molecules and Y is an atom.

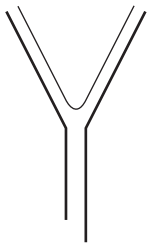
C W, Y and Z are molecules and X is an atom.

D X, Y and Z are molecules and W is an atom.

15 Hexane and octane are liquid hydrocarbons that mix together.

Which apparatus is used to separate a mixture of these two liquids?

A



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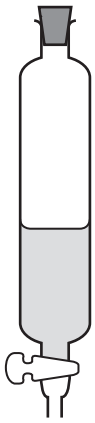
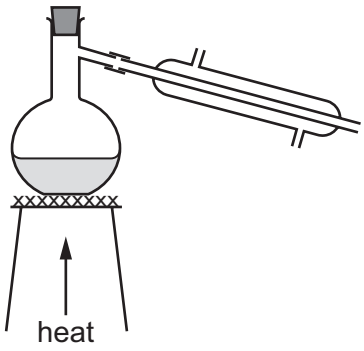
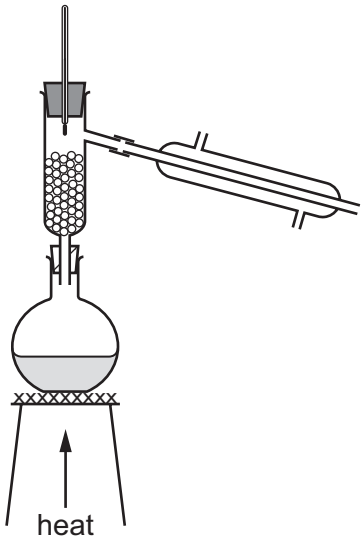


C



D



16 Which row describes the properties of a simple covalent compound?

	conducts electricity when solid	conducts electricity when liquid	boiling point / °C
A	no	no	60
B	no	no	2230
C	no	yes	1400
D	yes	yes	2850

17 Which statement describes what happens during electrolysis?

A Covalent compounds produce more complex substances.

B Covalent compounds produce simpler substances.

C Ionic compounds produce more complex substances.

D Ionic compounds produce simpler substances.

[Turn over

18 Methane is used as a fuel.

Which row describes the temperature change and the type of reaction when methane burns?

	temperature change	type of reaction
A	decrease	endothermic
B	decrease	exothermic
C	increase	endothermic
D	increase	exothermic

19 Dilute sulfuric acid reacts with a piece of zinc.

Which change does **not** increase the rate of reaction?

A Use a catalyst.

B Use a larger volume of dilute sulfuric acid.

C Use an equal volume of more concentrated sulfuric acid.

D Use the same mass of powdered zinc.

20 Which word equation represents a redox reaction?

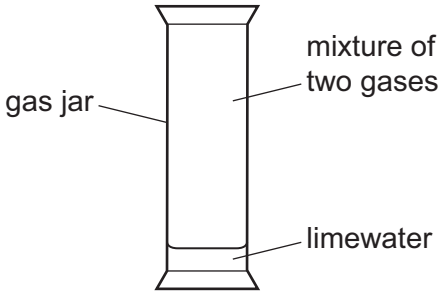
A calcium carbonate $\rightarrow$ calcium oxide + carbon dioxide

B calcium oxide + hydrochloric acid $\rightarrow$ calcium chloride + water

C copper oxide + carbon $\rightarrow$ copper + carbon dioxide

D sodium oxide + water $\rightarrow$ sodium hydroxide

21 A mixture of two gases is shaken with limewater.



The limewater turns milky.

The remaining gas relights a glowing splint.

What are the gases?

A carbon dioxide and hydrogen

B carbon dioxide and oxygen

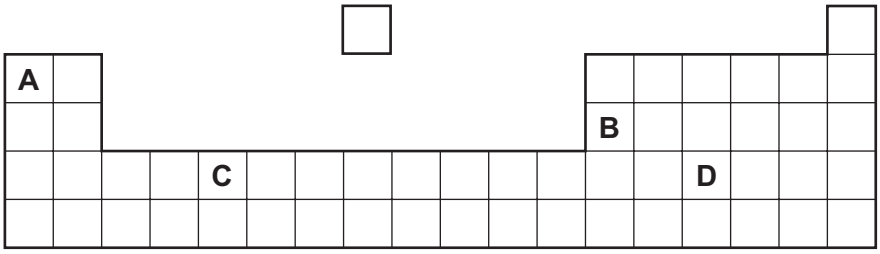
C carbon monoxide and hydrogen

D hydrogen and oxygen

22 Part of the Periodic Table is shown.

The letters are not the symbols of the elements.

Which element has a high density and forms coloured compounds?



23 Which metal reacts most quickly with dilute hydrochloric acid?

A calcium

B copper

C magnesium

D zinc

24 Which gas is the most abundant in clean air?

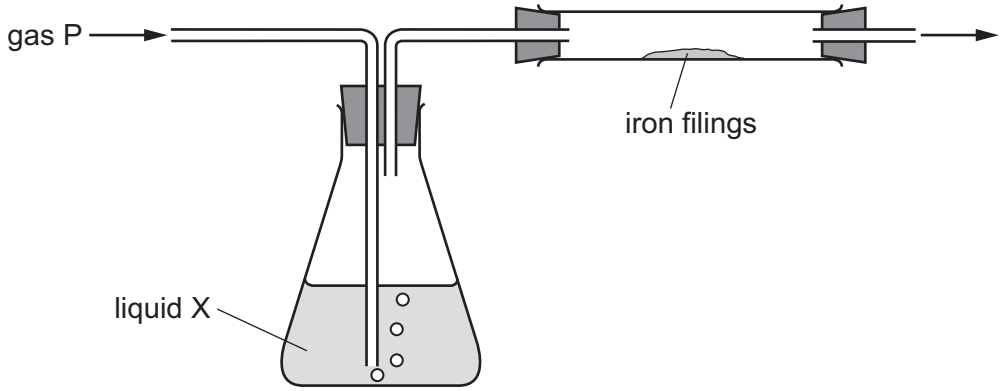
A argon

B carbon dioxide

C nitrogen

D oxygen

25 The diagram shows gas P being passed through liquid X and over iron filings.



Which gas and liquid cause the iron to rust?

	gas P	liquid X
A	nitrogen	concentrated sulfuric acid (a drying agent)
B	nitrogen	water
C	oxygen	concentrated sulfuric acid (a drying agent)
D	oxygen	water

26 Which chemical is used to reduce the acidity of soil?

A ammonium nitrate

B calcium oxide

C magnesium sulfate

D potassium chloride

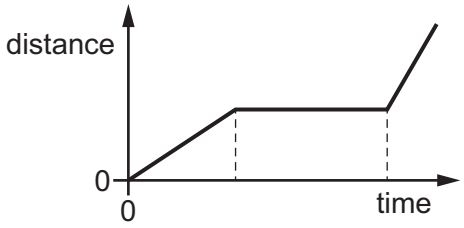
27 Ethanol is formed by the reaction of ethene with ……1…… .

Ethanol burns in excess air to produce ……2…… and water.

Which words complete gaps 1 and 2?

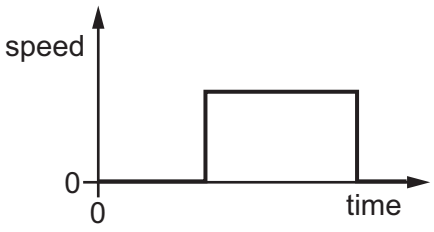
	1	2
A	oxygen	carbon dioxide
B	oxygen	carbon monoxide
C	steam	carbon dioxide
D	steam	carbon monoxide

28 The diagram shows a distance-time graph for a journey.



Which is the speed-time graph for this journey?

A



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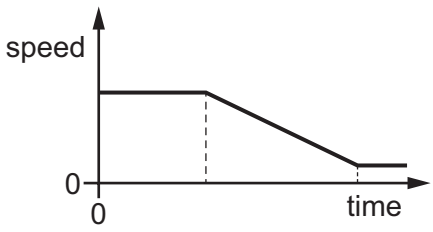

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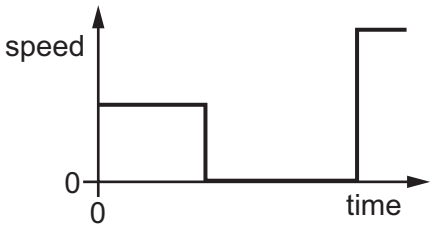
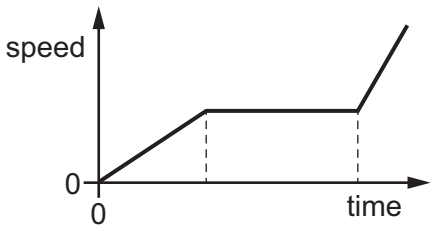


D



29 A student wishes to determine the density of a small solid object.

First she finds the mass of the object.

What should she do next?

A Attach the object to a spring and measure the change in length of the spring.

B Heat the object until it melts completely and measure how long it takes.

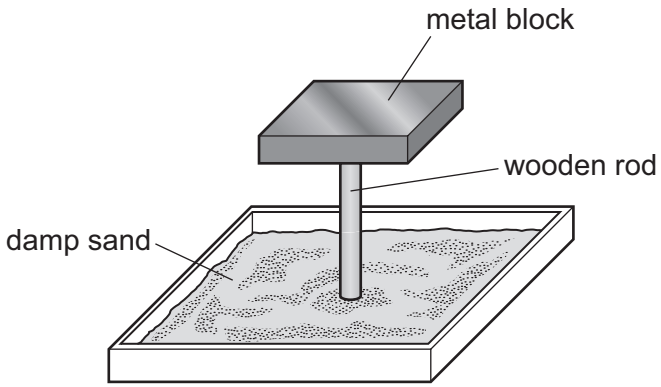
C Let the object fall through a distance of 1.0 m and measure how long it takes.

D Put the object in water in a measuring cylinder and measure the change in reading.

30 A student has two light wooden rods with different diameters, a light metal block, a heavy metal block and a tray of damp sand.

Each metal block is placed on each wooden rod in turn.

The diagram shows the arrangement.



Which combination of block and rod causes the rod to sink the furthest into the sand?

A the heavy block on the rod with the larger diameter

B the heavy block on the rod with the smaller diameter

C the light block on the rod with the larger diameter

D the light block on the rod with the smaller diameter

31 Which source of energy is renewable?

A geothermal

B natural gas

C nuclear fission

D oil

32 Two substances X and Y are in different states.

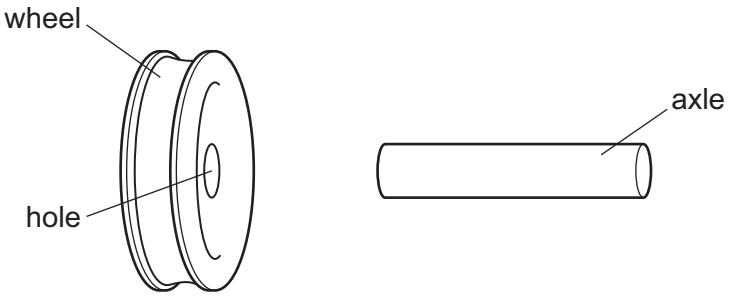
Substance X has a definite shape and has a definite volume.

Substance Y has no definite shape but has a definite volume.

Which row gives the state of each substance?

	substance X	substance Y
A	solid	liquid
B	solid	gas
C	liquid	solid
D	liquid	gas

33 An axle is slightly larger than the hole in a wheel made from the same metal.



How could an engineer fit the wheel onto the axle?

A cool the axle only

B cool the axle and cool the wheel by the same temperature change

C heat the axle only

D heat the axle and heat the wheel by the same temperature change

34 There is a vacuum between the double walls of a vacuum flask.

Which types of heat transfer are reduced by the vacuum?

A conduction, convection and radiation

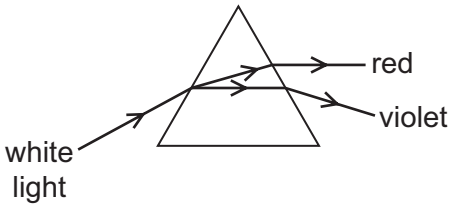
B conduction and convection only

C conduction and radiation only

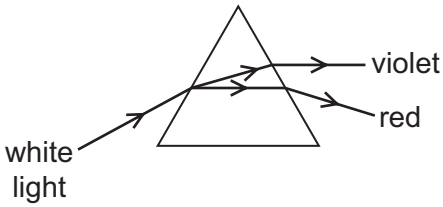
D convection and radiation only

35 Which diagram shows the dispersion of white light by a glass prism?

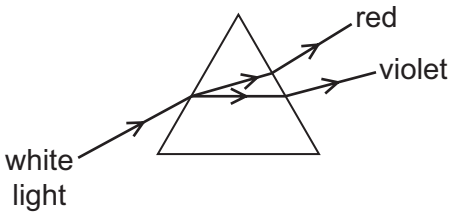
A



B



C



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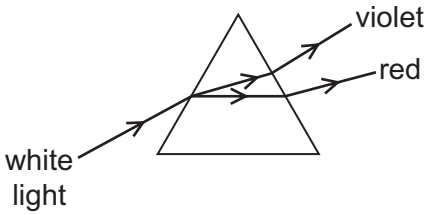

36 A person stands 160 m away from a tall building and claps his hands. He hears the echo 1.0 s later.

What is the speed of sound in air?

A 80 m / s **B** 160 m / s **C** 320 m / s **D** 640 m / s

37 Parts of an old car are being recycled.

An electromagnet is used to lift some parts of the car.

Which parts of the car are lifted using an electromagnet?

A the aluminium engine block

B the plastic interior fittings

C the rubber tyres

D the steel body parts

38 An ammeter is connected in a circuit with a resistor.

How is the ammeter used?

A It is connected in parallel with the resistor to measure the total charge flowing through it.

B It is connected in parallel with the resistor to measure the current in it.

C It is connected in series with the resistor to measure the total charge flowing through it.

D It is connected in series with the resistor to measure the current in it.

39 A circuit contains a lamp and a fuse.

There is a current of 2.0 A in the lamp and it operates normally.

A fault develops in the lamp. The current in the circuit increases, and the fuse now blows.

The diagrams show two circuits.

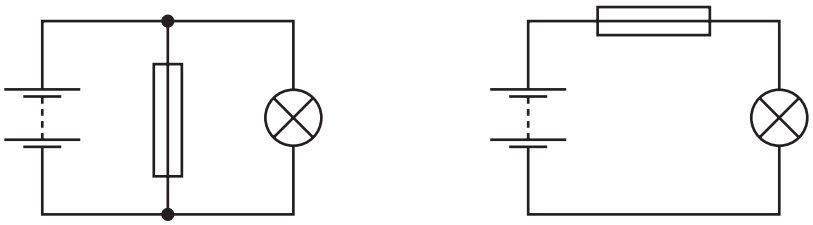

diagram 1 diagram 2

Which is the circuit used and what is the effect of the fuse when it blows?

	circuit	effect of fuse
A	diagram 1	reduces current to 0
B	diagram 1	reduces current to 2.0 A
C	diagram 2	reduces current to 0
D	diagram 2	reduces current to 2.0 A

40 A radiation detector is placed near to a radioactive source. The count rate on the detector includes background radiation.

How can the radiation due to the source itself be determined?

A carry out the experiment in a different laboratory

B carry out the experiment in a vacuum

C measure the count rate three times and average the result

D measure the count rate without the source and subtract this value from the first reading

The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89–103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

Key

atomic number
atomic symbol
name
relative atomic mass

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

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