**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

**COMBINED SCIENCE** **0653/11**

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 20.
Electronic calculators may be used.

This document consists of **18** printed pages and **2** blank pages.

**1** Which two structures are found in plant cells but **not** in animal cells?

**A** cell membrane and cell wall

**B** cell wall and chloroplasts

**C** chloroplasts and nucleus

**D** nucleus and cell membrane

**2** Which process depends on diffusion?

**A** circulation

**B** digestion

**C** gaseous exchange

**D** phagocytosis

**3** Biological catalysts speed up reactions in the body.

What is another name for biological catalysts?

**A** antibodies

**B** enzymes

**C** fatty acids

**D** hormones

**4** A food substance was tested with various reagents. The results of the tests are shown.

| reagent | Benedict's solution | biuret | ethanol | iodine solution |
|---|---|---|---|---|
| result | turned orange | stayed pale blue | went milky | went blue / black |

Which element did the food substance **not** contain?

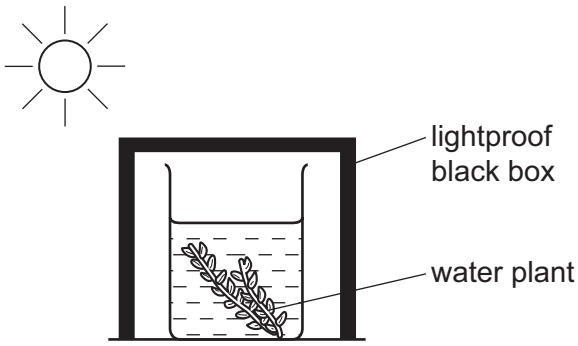
**A** carbon

**B** hydrogen

**C** nitrogen

**D** oxygen

**5** The diagram shows a water plant surrounded by a black box.




Which change takes place if the black box is removed?

**A** Oxygen production increases.

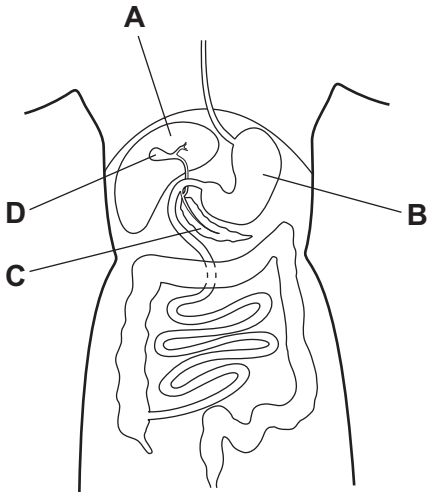
**B** Respiration stops.

**C** Stomata close.

**D** Water uptake decreases.

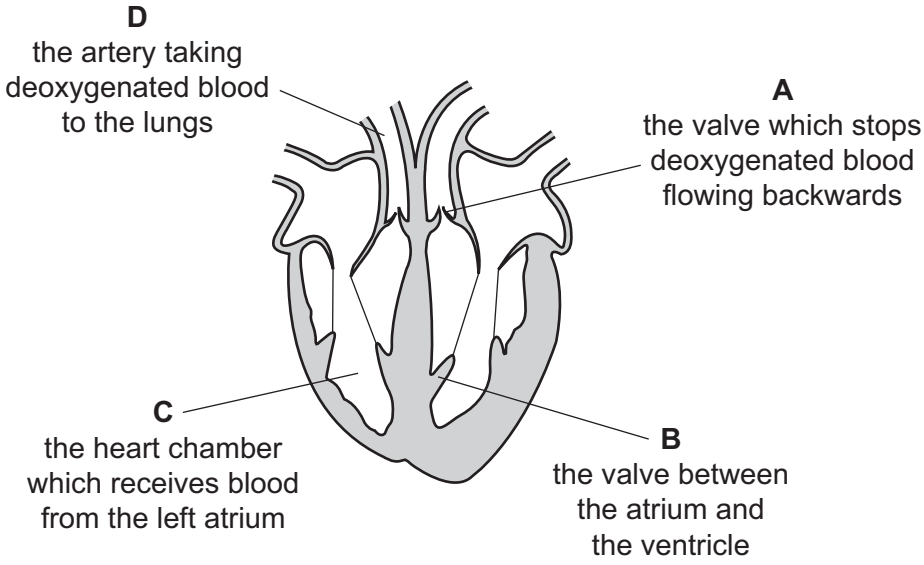
**6** The diagram shows part of the human alimentary canal.

Where is bile made?



**7** The diagram shows a section through the heart.

Which labelled part has the correct function stated?




**8** Which word equation represents aerobic respiration?

**A** carbon dioxide + water → glucose

**B** carbon dioxide + water → glucose + oxygen

**C** glucose + oxygen → carbon dioxide

**D** glucose + oxygen → carbon dioxide + water

**9** Which row states how the composition of expired air is different to the composition of inspired air?

| | concentration of gases in expired air | | | |
|---|---|---|---|---|
| | carbon dioxide | oxygen | nitrogen | water vapour |
| **A** | less | less | unchanged | unchanged |
| **B** | less | more | less | more |
| **C** | more | less | unchanged | more |
| **D** | more | more | less | unchanged |

**10** Which statement about adrenaline is **not** correct?

**A** Adrenaline is transported in the blood plasma.

**B** Adrenaline lowers the blood glucose concentration.

**C** The heart is one of the target organs for adrenaline.

**D** The liver destroys adrenaline.

**11** The diagram shows a calendar for February and March.

| | February | | | | March | | | |
|---|---|---|---|---|---|---|---|---|
| | 7 | 14 | 21 | 28 | 7 | 14 | 21 | 28 |
| 1 | 8 | 15 | 22 | 1 | 8 | 15 | 22 | 29 |
| 2 | 9 | 16 | 23 | 2 | 9 | 16 | 23 | 30 |
| 3 | 10 | 17 | 24 | 3 | 10 | 17 | 24 | 31 |
| 4 | 11 | 18 | 25 | 4 | 11 | 18 | 25 | |
| 5 | 12 | 19 | 26 | 5 | 12 | 19 | 26 | |
| 6 | 13 | 20 | 27 | 6 | 13 | 20 | 27 | |

Ovulation occurs on 8 February.

When is menstruation most likely to begin?

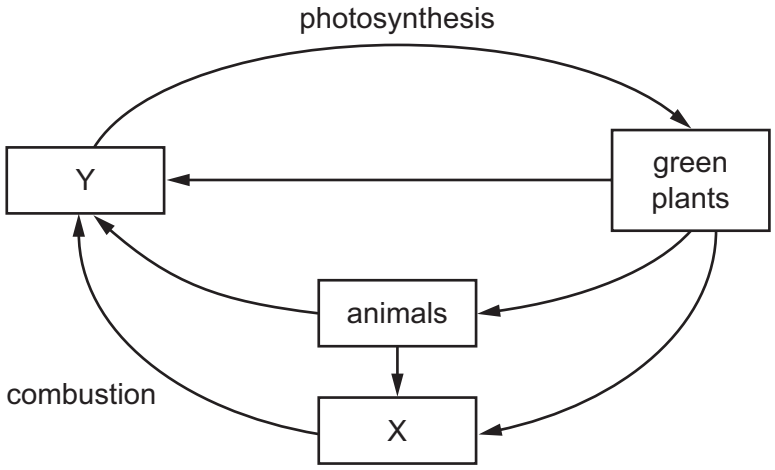
**A** 9 February – 11 February

**B** 14 February – 16 February

**C** 21 February – 23 February

**D** 7 March – 9 March

**12** The diagram shows part of the carbon cycle.



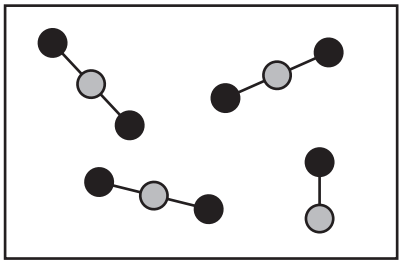

What are X and Y?

| | X | Y |
|---|---|---|
| **A** | carbon dioxide | oxygen |
| **B** | fossil fuel | carbon dioxide |
| **C** | fossil fuel | oxygen |
| **D** | oxygen | carbon dioxide |

**13** Which are possible harmful effects of deforestation?

| | global warming | species extinction |
|---|---|---|
| **A** | ✓ | ✓ |
| **B** | ✓ | ✗ |
| **C** | ✗ | ✓ |
| **D** | ✗ | ✗ |

**14** The diagram represents a mixture of carbon dioxide, $CO_2$, and carbon monoxide, CO.



Which statement is correct?

**A** The mixture contains 4 elements.

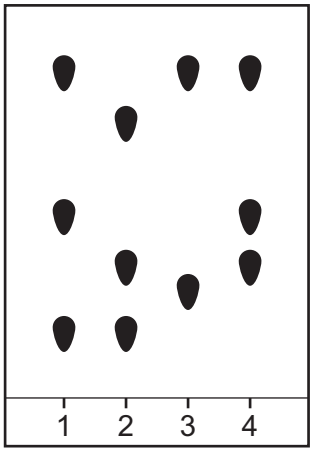
**B** The mixture contains 4 molecules.

**C** The mixture contains 11 elements.

**D** The mixture contains 11 molecules.

**15** Four dyes are separated using chromatography.

The results are shown.

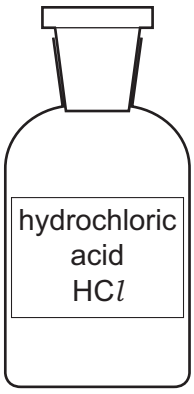



Which dyes contain two colours that are present in both dyes?

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

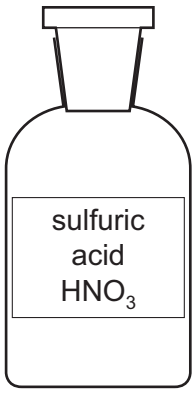
**16** On which label does the formula match the name of the acid?

**A**

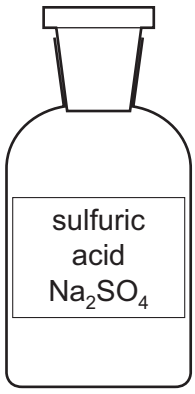



**B**


**C**




**D**




**17** The breakdown of molten lead bromide by ……1…… forms the elements lead and bromine.

Lead is formed at the ……2…… .

Which words complete gaps 1 and 2?

| | 1 | 2 |
|---|---|---|
| **A** | electrolysis | anode |
| **B** | electrolysis | cathode |
| **C** | reduction | anode |
| **D** | reduction | cathode |



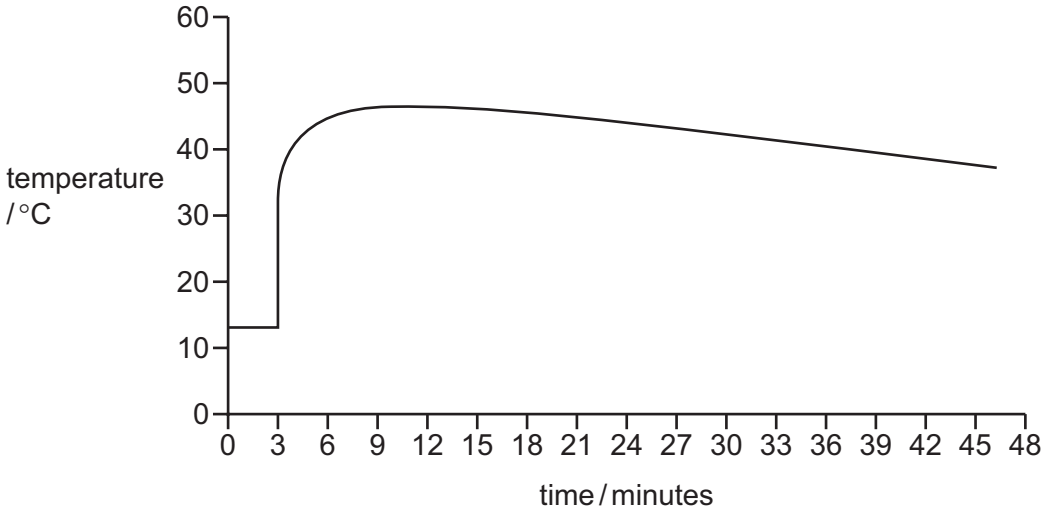


**[Turn over**

**18** The temperature of aqueous copper sulfate is measured.

After three minutes, magnesium is stirred into the solution. The temperature of the mixture is recorded every minute.

The results are shown.




Which description of the chemical reaction is correct?

**A** endothermic then exothermic

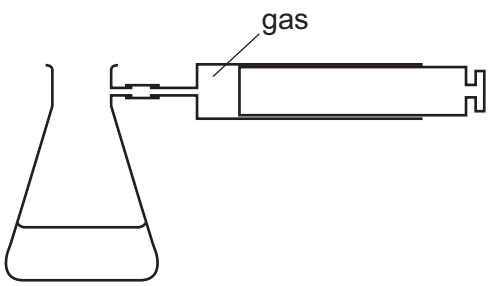
**B** endothermic only

**C** exothermic then endothermic

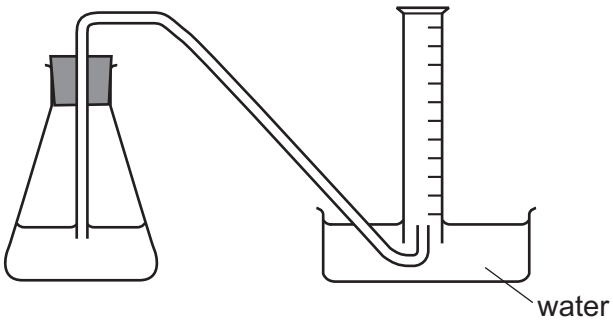
**D** exothermic only

**19** Which diagram shows apparatus used to investigate the rate of a reaction in which a gas is given off?

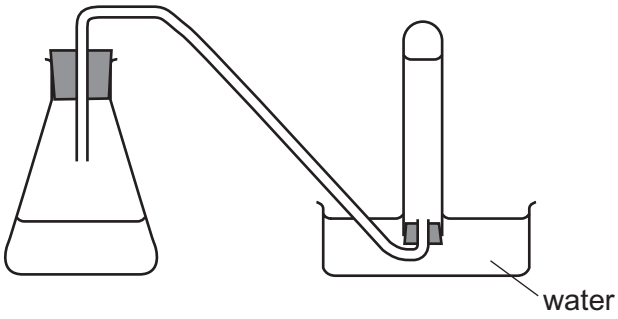
**A**



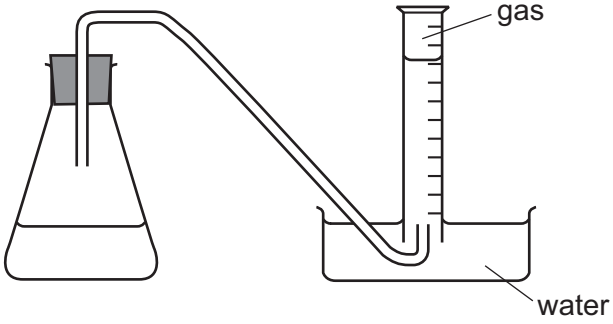

**B**




**C**




**D**




**20** Iron oxide reacts with carbon monoxide.

The word equation for the reaction is:

iron oxide + carbon monoxide → iron + carbon dioxide

Which statement is **not** correct?

**A** Carbon is neither oxidised nor reduced.

**B** Carbon is oxidised.

**C** Iron is reduced.

**D** This is a redox reaction.

**21** The results of two tests on solid P are shown.

| | test | result |
|---|---|---|
| 1 | add aqueous sodium hydroxide to solid | gas given off that turns moist red litmus paper blue |
| 2 | dissolve solid in water<br>add dilute aqueous silver nitrate | white precipitate formed |

What is P?

**A** aluminium carbonate

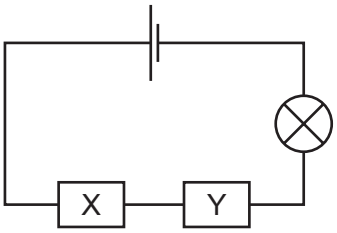
**B** aluminium sulfate

**C** ammonium chloride

**D** ammonium nitrate

**22** Two substances, X and Y, are connected in a circuit as shown.

The lamp lights.

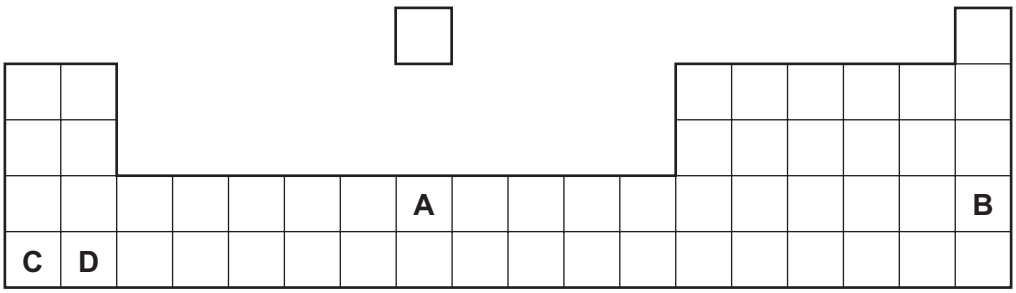



What are X and Y?

| | X | Y |
|---|---|---|
| **A** | carbon | sulfur |
| **B** | copper | lead |
| **C** | copper | sulfur |
| **D** | sulfur | lead |

**23** The positions of four elements are shown in the outline of the Periodic Table.

Which element has a high melting point and forms coloured compounds?



**24** Which process is used to extract copper from copper oxide?

**A** Heat the copper oxide on its own.

**B** Heat the copper oxide with carbon.

**C** Heat the copper oxide with carbon dioxide.

**D** Heat the copper oxide with water and then filter.

**25** What is a chemical test for water?

**A** It has a boiling point of 100 °C.

**B** It has a density of 1 g / $cm^3$.

**C** It turns anhydrous copper sulfate from white to blue.

**D** It turns pink cobalt chloride paper to blue.

**26** Gasoline is a hydrocarbon fuel obtained from petroleum.

Which statement is correct?

**A** Gasoline burns to form carbon dioxide and water.

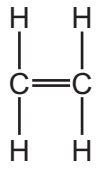
**B** Gasoline contains the elements carbon, hydrogen and oxygen.

**C** Gasoline is used as a fuel in diesel engines.

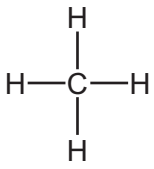
**D** The combustion of gasoline is an endothermic reaction.

**27** What is the structure of ethane?

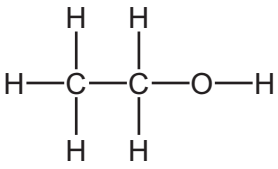
**A**



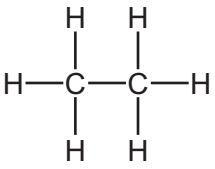
**B**



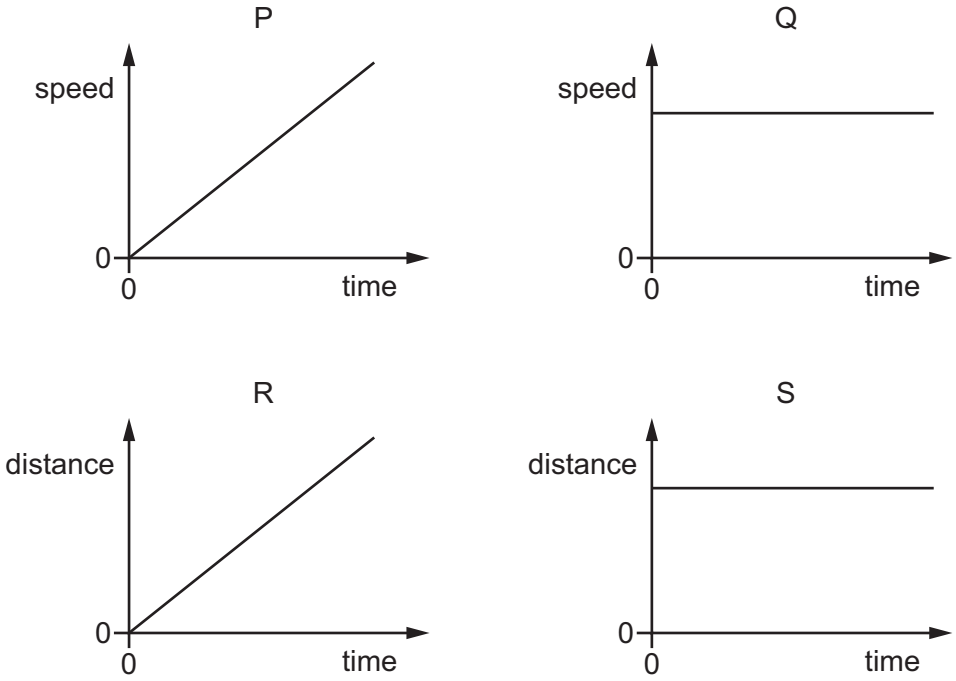
**C**



**D**



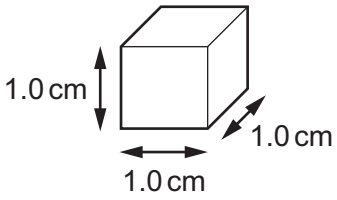
**28** Graphs P and Q are speed-time graphs. Graphs R and S are distance-time graphs.




Which of the graphs represent the motion of an object moving with constant speed?

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

**29** A cube of aluminium has sides of length 1.0 cm.




Compared with this cube, which statement about a cube of aluminium with sides of 2.0 cm is correct?

**A** It has the same density.

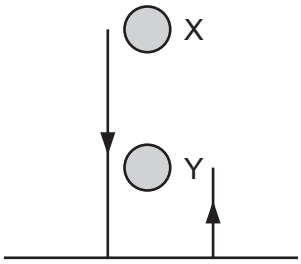
**B** It has the same mass.

**C** It has twice the density.

**D** It has twice the mass.

**30** A ball is released from rest at position X and falls to the ground.

It rebounds to a maximum height at position Y, as shown.




Which statement about the ball at Y is correct?

**A** It has less gravitational energy than at X.

**B** It has less kinetic energy than at X.

**C** It has less sound energy than at X.

**D** It has less thermal energy than at X.



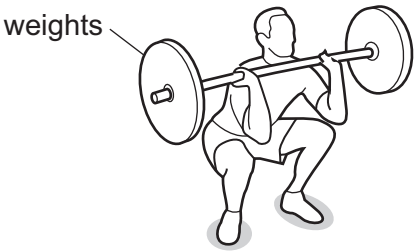


**[Turn over**

**31** Weightlifting involves a number of different stages.

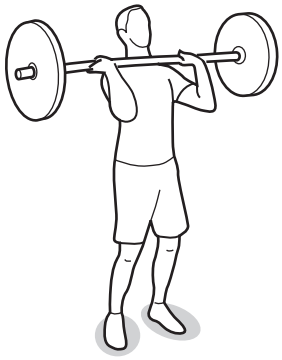
In which stage is **no** work being done on the weights?

**A**



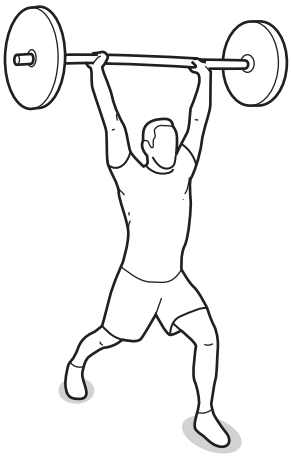

The weights are lifted up off the floor.

**B**



The weights are lifted as the man stands up.

**C**



The weights are lifted above the head.

**D**

The weights are held stationary above the head.

**32** A scientist investigates two different substances, P and Q.

Substance P completely fills its container but can be compressed.

Substance Q is not in a container but has a definite shape.

In which state is each substance?

| | substance P | substance Q |
|---|---|---|
| **A** | gas | liquid |
| **B** | gas | solid |
| **C** | liquid | gas |
| **D** | liquid | solid |

**33** A liquid evaporates when molecules leave its surface.

Which molecules leave the surface, and what happens to the temperature of the remaining liquid?

**A** The more energetic molecules leave and the temperature falls.

**B** The more energetic molecules leave and the temperature rises.

**C** The less energetic molecules leave and the temperature falls.

**D** The less energetic molecules leave and the temperature rises.

**34** A student investigates a wave.

First he measures the distance between one wave crest and the next wave crest.

Next, he counts the number of wave crests passing a fixed point in one second.

Which properties of the wave has the student determined?

**A** the amplitude and the frequency

**B** the amplitude and the speed

**C** the wavelength and the frequency

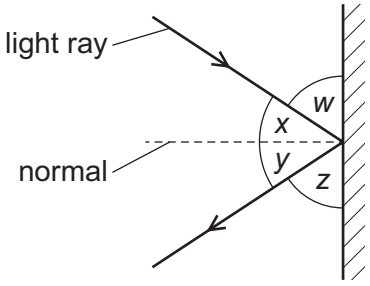
**D** the wavelength and the speed





**[Turn over**

**35** Light from a ray-box strikes a plane mirror and reflects off it.




not to scale

On the diagram, four angles *w*, *x*, *y* and *z* are indicated.

Which equation **must** be correct?

**A** $w = x$ **B** $w = z$ **C** $x = z$ **D** $y = z$

**36** Which list shows electromagnetic waves in order of decreasing wavelength (largest to smallest)?

**A** gamma rays → radio waves → infra-red → microwaves

**B** microwaves → visible light → X-rays → infra-red

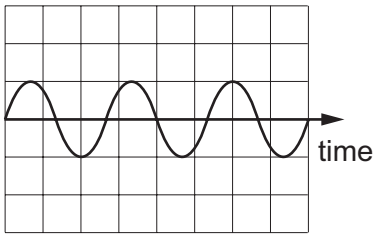
**C** radio waves → visible light → ultraviolet → X-rays

**D** X-rays → infra-red → microwaves → visible light

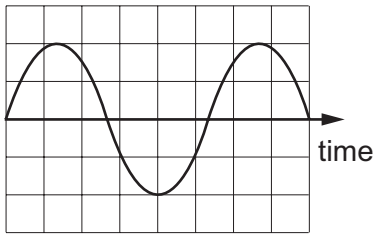
**37** The diagrams represent four different sound waves. The scales are the same in all the diagrams.

Which sound has the lowest pitch?

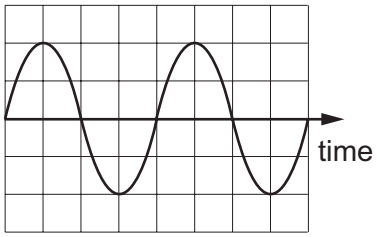
**A**



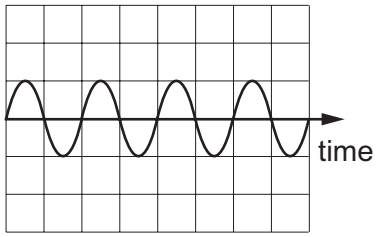

**B**




**C**

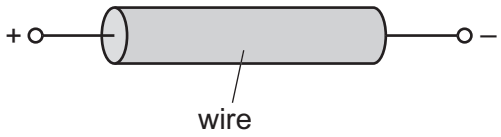



**D**



**38** There is a current in a metal wire when a potential difference is applied across its ends.

The diagram shows which ends are connected to the positive and negative terminals.




How does the charge flow in the wire?

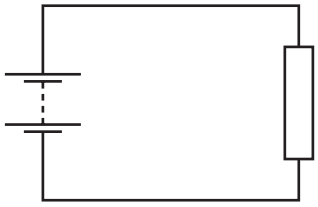
**A** electrons flow from left to right

**B** electrons flow from right to left

**C** protons flow from left to right

**D** protons flow from right to left

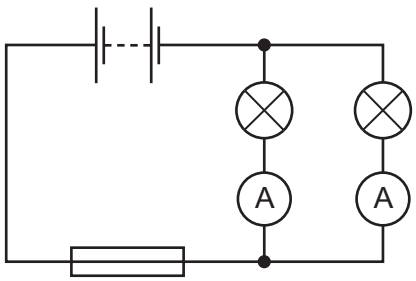
**39** A circuit contains a battery connected to a resistor.



Which values of electromotive force (e.m.f.) and resistance produce the smallest current?

| | e.m.f. / V | resistance / Ω |
|---|---|---|
| **A** | 6.0 | 10 |
| **B** | 6.0 | 20 |
| **C** | 24 | 80 |
| **D** | 24 | 160 |

**40** Two lamps and two ammeters are connected in the circuit shown. Each ammeter reads 1.0 A.




Which is the most suitable rating for the fuse in this circuit?

**A** 0.5 A **B** 1 A **C** 3 A **D** 13 A

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## 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.).