



Cambridge IGCSE™

COMBINED SCIENCE

Paper 1 Multiple Choice (Core)

0653/11

May/June 2024

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.

INFORMATION

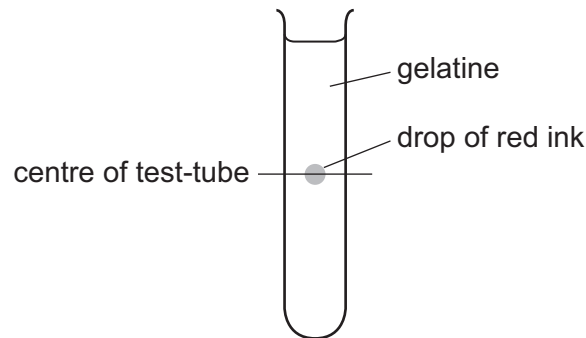
- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages.

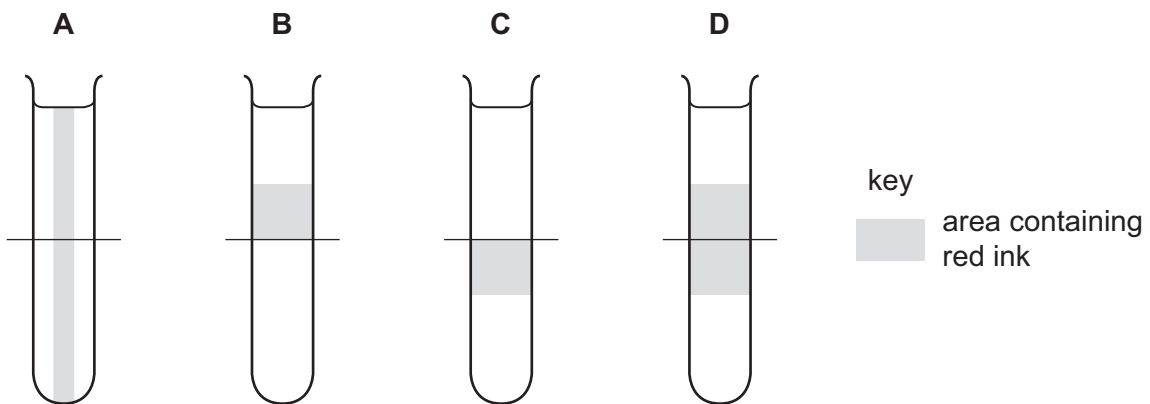


- 1 Which characteristic of living organisms is the removal of substances in excess of requirements?
- A** excretion
B nutrition
C reproduction
D respiration
- 2 A drop of red ink is injected into the centre of a test-tube containing gelatine. Gelatine is a clear substance that allows ink particles to diffuse through it.

The diagram shows the test-tube at the start of the experiment.



Which diagram correctly shows the appearance of the test-tube after a period of time?



- 3 Glycogen, protein and starch are large molecules.

Which row correctly names the smaller molecules that combine to produce these large molecules?

| | large molecules | | |
|----------|-----------------|-------------|----------|
| | glycogen | protein | starch |
| A | glucose | amino acids | glucose |
| B | glucose | amino acids | glycerol |
| C | glycerol | fatty acids | glycerol |
| D | glycerol | fatty acids | glucose |

4 Which statement about enzymes is correct?

- A Enzyme activity always continues to increase as the temperature increases.
- B Enzyme activity is **not** affected by pH.
- C Enzymes are biological catalysts.
- D Enzymes are proteins that always slow down reactions.

5 Vegetarians do **not** eat meat.

Which nutrient in meat do vegetarians need to get from other kinds of food?

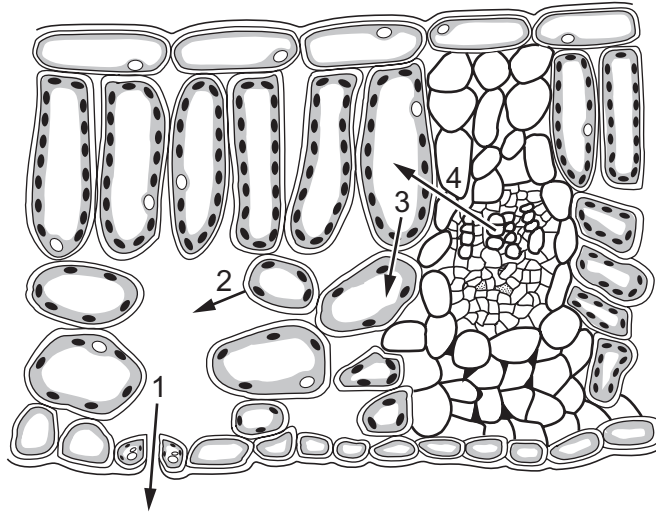
- A fibre
- B protein
- C starch
- D vitamin C

6 Chemical digestion occurs in the alimentary canal so that molecules can be absorbed.

Which type of molecules are absorbed?

- A large insoluble molecules
- B large soluble molecules
- C small insoluble molecules
- D small soluble molecules

- 7 The diagram shows a section through a leaf. The arrows represent the movement of water by diffusion, evaporation or osmosis.



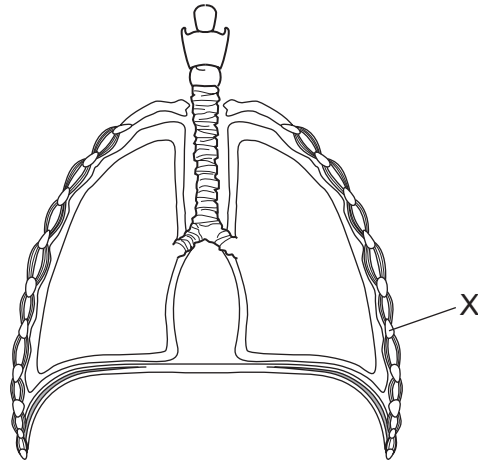
Which arrows represent diffusion and evaporation?

| | diffusion | evaporation |
|----------|-----------|-------------|
| A | 1 | 2 |
| B | 2 | 3 |
| C | 3 | 4 |
| D | 4 | 1 |

- 8 Which row is correct for inspired air when it is compared to expired air?

| | oxygen | carbon dioxide | water vapour |
|----------|--------|----------------|--------------|
| A | higher | lower | higher |
| B | higher | lower | lower |
| C | lower | higher | lower |
| D | lower | higher | higher |


9 The diagram shows the human gas exchange system.



Which part of the gas exchange system is labelled X?





- A bronchus
- B diaphragm
- C rib
- D trachea

10 The table shows some data about a student.

| pupil size in eye | pulse rate /beats per minute |
|---|---------------------------------|
|  | 68 |

The student is frightened by a sudden loud noise.

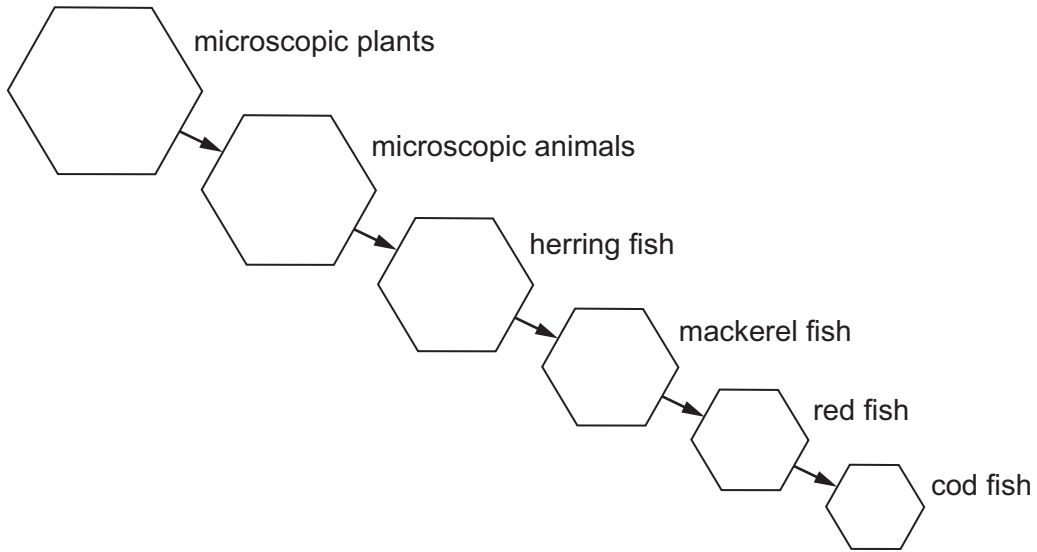
Which row shows the results immediately after the loud noise?

| | pupil size in eye | pulse rate /beats per minute |
|----------|---|---------------------------------|
| A |  | 60 |
| B |  | 80 |
| C |  | 60 |
| D |  | 80 |

11 Which row is correct for asexual reproduction?

| | genetically identical offspring | fusion of nuclei | number of parents |
|----------|---------------------------------------|---------------------|----------------------|
| A | no | yes | two |
| B | yes | no | one |
| C | no | yes | one |
| D | yes | no | two |

12 The diagram represents a food chain found in the sea.

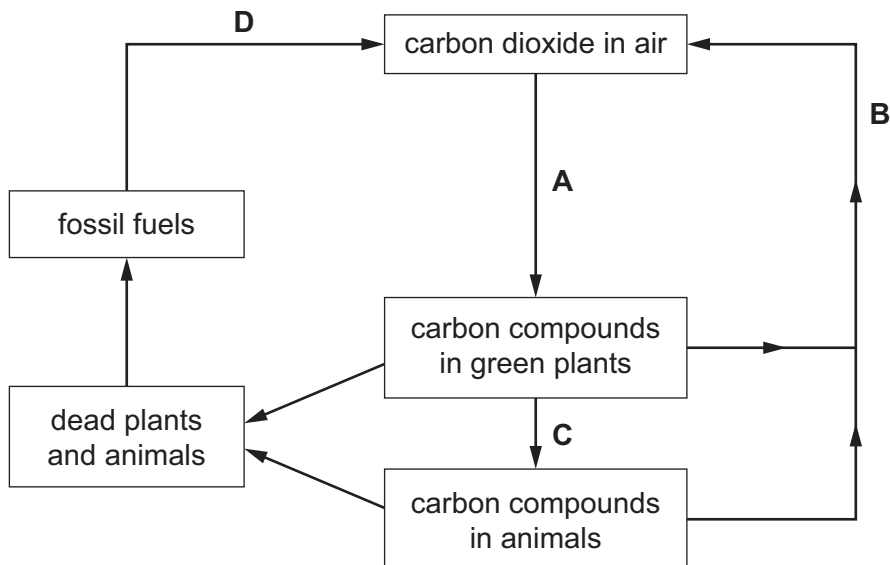


How many consumer levels are there?

- A** 1 **B** 4 **C** 5 **D** 6

13 The diagram shows part of the carbon cycle.

Which arrow represents combustion?



14 A fixed mass of argon gas in a sealed container is heated.

The pressure inside the container increases.

Which statement explains why the pressure increases?

- A There is an increase in the number of gaseous particles inside the container.
- B There is an increase in the number of collisions per second between the particles of gas and the walls of the container.
- C The particles of gas have less energy and collide with the wall of the container more frequently.
- D There is a decrease in the space that the particles have to move in.

15 Which processes are physical changes?

- 1 burning methane gas
- 2 dissolving sugar in water
- 3 evaporating ethanol
- 4 melting an ice cube
- 5 rusting of iron

- A 1, 3 and 4 B 1, 4 and 5 C 2, 3 and 4 D 2, 3 and 5

16 The nucleon number (mass number) is the total number of1..... and2..... in the nucleus of an atom.

Which words complete this sentence?

| | 1 | 2 |
|---|----------|-----------|
| A | protons | neutrons |
| B | protons | electrons |
| C | neutrons | electrons |
| D | neutrons | shells |

17 Sodium chloride is represented by NaCl .

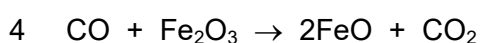
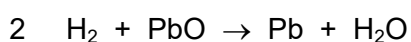
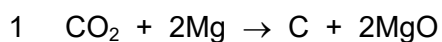
What is this representation called?

- A a dot-and-cross diagram
- B an equation
- C a formula
- D a symbol

18 What is observed when molten lead(II) bromide is electrolysed using inert electrodes?

- A Bubbles of a brown gas appear at the anode.
- B Bubbles of colourless gases appear at both electrodes.
- C Bubbles of a colourless gas appear at the cathode only.
- D No gas bubbles are observed at either electrode.

19 Four equations for reactions involving oxidation and reduction are listed.



Which statement is correct?

- A In reaction 1, the Mg is being reduced.
 - B In reaction 2, the PbO is being oxidised.
 - C In reaction 3, the CuO is being oxidised.
 - D In reaction 4, the Fe₂O₃ is being reduced.
- 20 A mixture of ammonium carbonate and ammonium chloride is heated with aqueous sodium hydroxide.

Which gas is produced?

- A ammonia
 - B carbon dioxide
 - C chlorine
 - D hydrogen chloride
- 21 An atom of an element in the Periodic Table has the electronic structure 2,8,8.

What is the group number of this element?

- A I
- B III
- C VII
- D VIII

22 Which property is the same for sodium and copper?

- A colour
- B density at room temperature
- C melting point
- D state at room temperature

23 Three properties of element X are listed.

- X reacts with dilute hydrochloric acid to make hydrogen.
- X is formed when carbon is heated with an oxide of X.
- X does not react with water.

What is the position of X in the reactivity series?

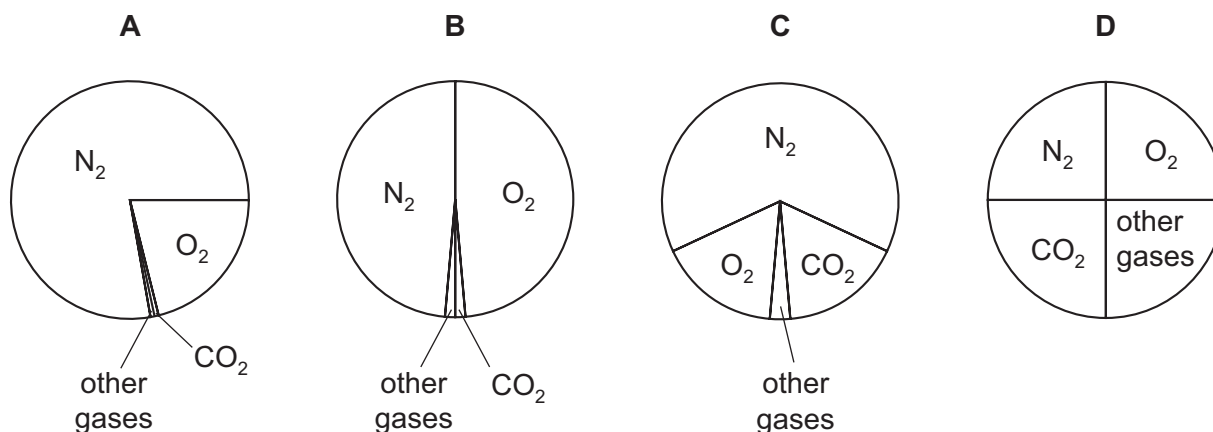
- A It is above sodium.
- B It is below copper.
- C It is below zinc but above copper.
- D It is between calcium and zinc.

24 Which processes are used in water treatment?

- 1 chlorination
- 2 cracking
- 3 filtration

- A 1, 2 and 3 B 1 and 2 only C 1 and 3 only D 2 and 3 only

25 Which pie chart shows the proportions of gases in clean air?



26 Which fraction obtained from petroleum by fractional distillation is used for making chemicals?

- A bitumen
- B gasoline
- C naphtha
- D refinery gas

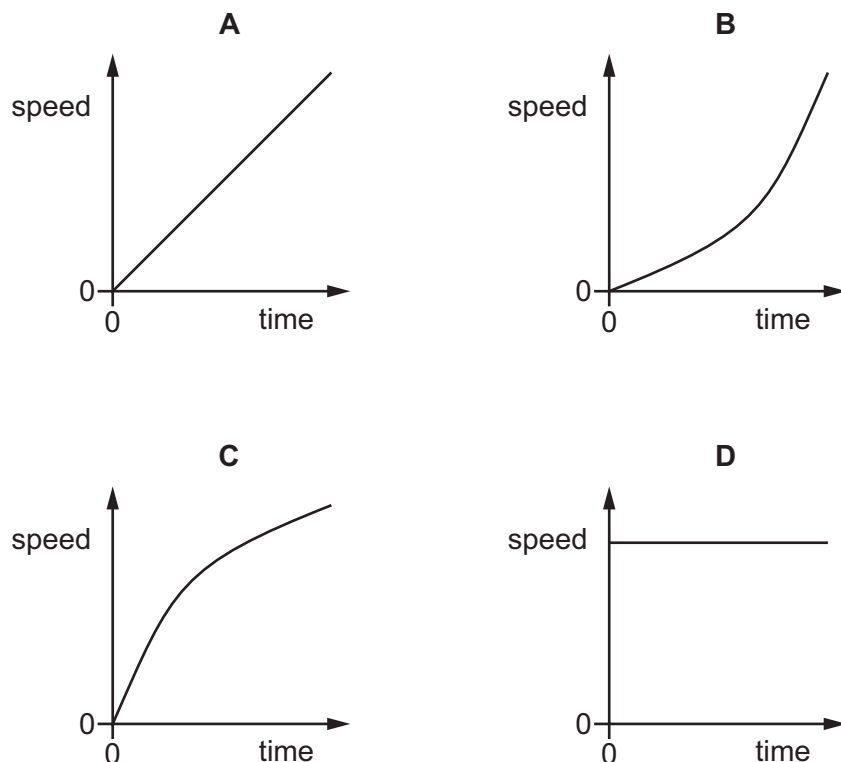
27 Which row about alkanes is correct?

| | type of hydrocarbon | products of complete combustion |
|----------|---------------------|---------------------------------|
| A | saturated | carbon dioxide and hydrogen |
| B | saturated | carbon dioxide and water |
| C | unsaturated | carbon dioxide and hydrogen |
| D | unsaturated | carbon dioxide and water |

28 Which row shows apparatus used to measure length, time and volume?

| | length | time | volume |
|----------|--------------------|--------------------|--------------------|
| A | measuring cylinder | metre rule | stop-clock |
| B | measuring cylinder | stop-clock | metre rule |
| C | metre rule | measuring cylinder | stop-clock |
| D | metre rule | stop-clock | measuring cylinder |

29 Which speed–time graph represents the motion of an object that is moving with constant speed?



30 Samples of three liquids, X, Y and Z, each have a volume of 16 cm^3 .

The mass of each sample is shown.

| sample of liquid | mass/g |
|------------------|--------|
| X | 13 |
| Y | 16 |
| Z | 19 |

Which liquids have a density less than 1.1 g/cm^3 ?

- A** X and Y **B** X only **C** Y and Z **D** Z only

31 Which object has a resultant force acting on it?

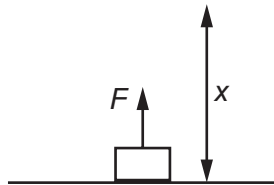
- A** an object moving at constant speed along a curved path
B an object moving at constant speed along a straight path
C an object moving at constant speed vertically upwards
D an object that is stationary

- 32 In three experiments, equal forces of magnitude F move the same block of wood through equal distances x .

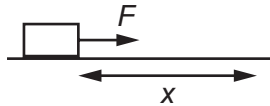
In experiment 1, the block is raised vertically.

In experiment 2, the block is moved horizontally.

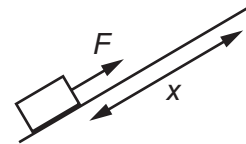
In experiment 3, the block is moved along a sloping board.



experiment 1



experiment 2



experiment 3

In each experiment, the block is moved at constant speed.

Which statement about the work done by the force in the experiments is correct?

- A The most work is done in experiment 1.
 - B The most work is done in experiment 2.
 - C The most work is done in experiment 3.
 - D The work done is the same in experiments 1, 2 and 3.
- 33 In which situation is energy **not** being transferred?
- A a book resting on a shelf
 - B an electric current lighting a lamp
 - C an electric kettle heating water
 - D sound travelling through air
- 34 The temperature of a gas increases.

What happens to the molecules of the gas?

- A Their average speed decreases.
- B Their average speed increases.
- C They contract.
- D They expand.

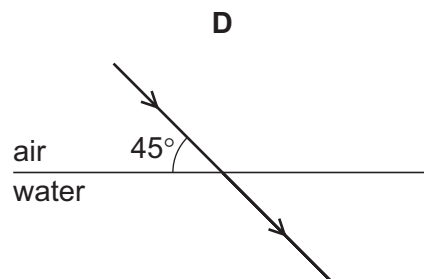
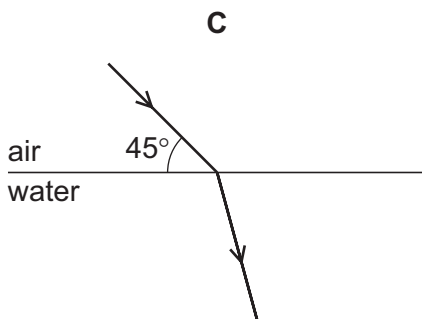
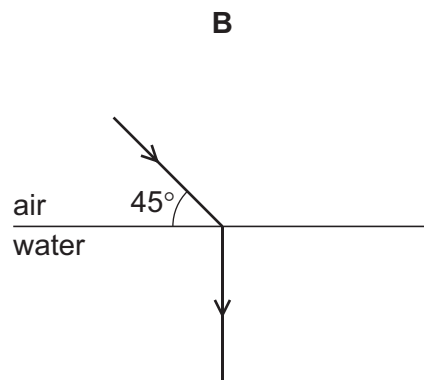
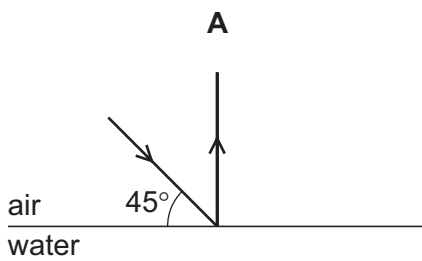
35 Energy is transferred from the Sun to the Earth through the vacuum of space.

Which method of energy transfer is involved?

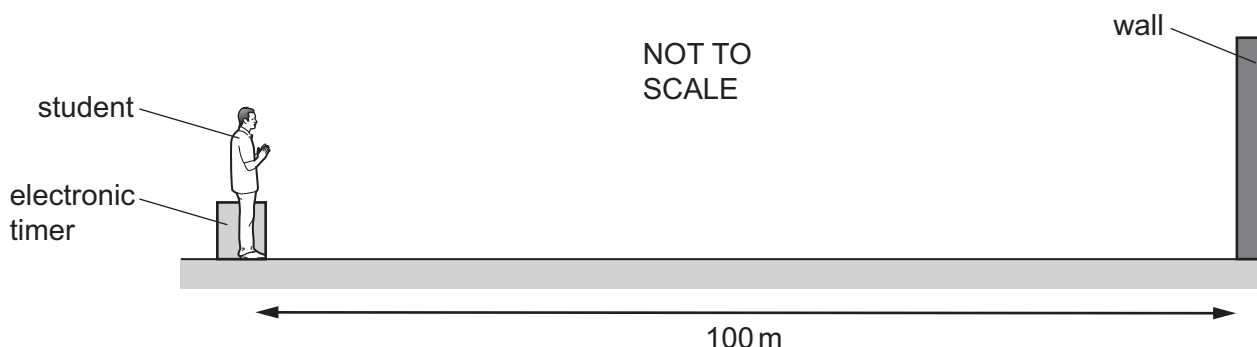
- A conduction
- B convection
- C evaporation
- D radiation

36 A ray of light in air strikes the surface of water at an angle of 45° .

Which diagram shows what happens to the ray after it strikes the surface?



- 37 A student measures the speed of sound. He claps his hands and the sound reflects back from a wall that is 100 m away from him.



An electronic timer next to the student detects the echo of the sound 0.60 s after the sound is made.

Which calculation gives the speed of sound?

- A $\frac{200}{0.30}$ m/s B $\frac{200}{0.60}$ m/s C $\frac{100}{0.60}$ m/s D $\frac{100}{1.2}$ m/s
- 38 A resistor has a resistance of $4.5\ \Omega$. The resistor is connected to a cell and there is a current of $0.60\ \text{A}$ in the resistor.
- What is the potential difference (p.d.) across the resistor?
- A $0.13\ \text{V}$ B $2.7\ \text{V}$ C $5.1\ \text{V}$ D $7.5\ \text{V}$
- 39 Why are electrical devices **not** used near a sink containing hot water?
- A Hot water causes overheating in the cables.
 B Hot water causes the fuse to blow.
 C Water damages the insulation around the cables.
 D Water conducts electricity and can cause an electric shock.
- 40 A $240\ \text{V}$ power supply produces a current of $8.0\ \text{A}$ in a heater that has a resistance of $30\ \Omega$. The power transferred in the heater is $1.9\ \text{kW}$.

What is the rating of an appropriate fuse for the circuit?

- A $10\ \text{A}$ B $2.0\ \text{kW}$ C $1.8\ \text{kW}$ D $30\ \Omega$

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The Periodic Table of Elements

| | | Group | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| I | II | III | IV | V | VI | VII | VIII | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 Li lithium 7 | 4 Be beryllium 9 | 11 Na sodium 23 | 12 Mg magnesium 24 | 19 K potassium 39 | 20 Ca calcium 40 | 37 Rb rubidium 85 | 55 Cs caesium 133 | 87 Fr francium — | 1 H hydrogen 1 | 2 He helium 4 | 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 — | 113 Nh nihonium — | 114 Fl flerovium — | 115 Mc moscovium — | 116 Lv livermorium — | 117 Ts tennessine — | 118 Og oganesson — |

Key

atomic number
atomic symbol
name
relative atomic mass

| | | | | | | | | | | | | | | |
|------------------------------|----------------------------|---------------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------------|----------------------------|-------------------------------|------------------------------|---------------------------|-------------------------------|------------------------------|------------------------------|
| 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 |
| 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 — |

lanthanoids

actinoids

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).