



Cambridge IGCSE™

COMBINED SCIENCE

Paper 1 Multiple Choice (Core)

0653/11

May/June 2023

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)

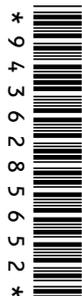
INSTRUCTIONS

- 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. Any blank pages are indicated.



1 Which characteristic of living organisms involves chemical reactions in cells that break down nutrient molecules and release energy?

- A excretion
- B nutrition
- C respiration
- D sensitivity

2 Which structures are present in an animal cell?

| | cell membrane | cell wall | cytoplasm | nucleus |
|----------|---------------|-----------|-----------|---------|
| A | ✓ | x | ✓ | ✓ |
| B | ✓ | ✓ | x | ✓ |
| C | ✓ | x | x | ✓ |
| D | x | ✓ | ✓ | x |

key

✓ = present

x = not present

3 The table shows the results of tests carried out on a sample of food.

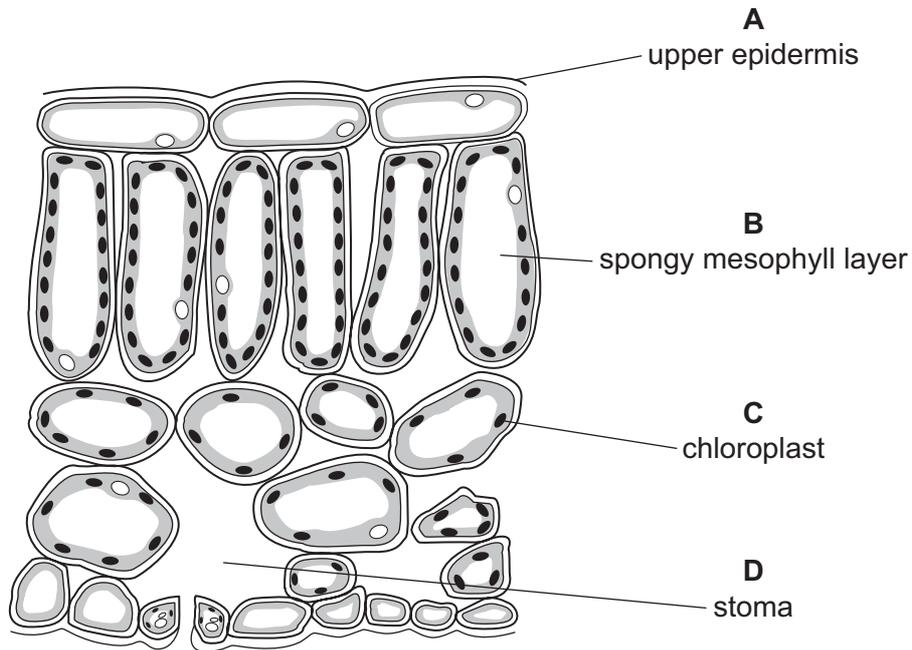
| test | result |
|------------|--------|
| Benedict's | orange |
| iodine | brown |
| biuret | purple |

Which nutrients are in the food?

- A protein, reducing sugar and starch
- B protein and reducing sugar only
- C protein and starch only
- D reducing sugar and starch only

4 The diagram shows a section through part of a leaf.

Which label is correct?

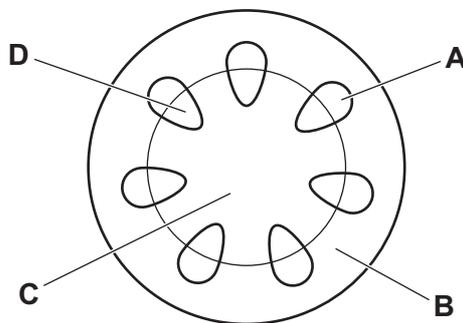


5 What is the purpose of chemical digestion?

- A to absorb minerals including calcium and iron
- B to pass food out as faeces
- C to break down large nutrient molecules into smaller molecules
- D to secrete enzymes

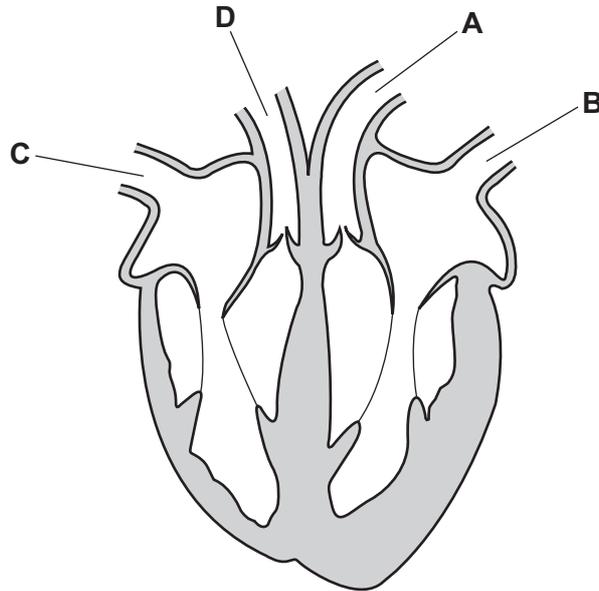
6 The diagram shows a cross-section through a plant stem.

Which labelled part is the xylem?



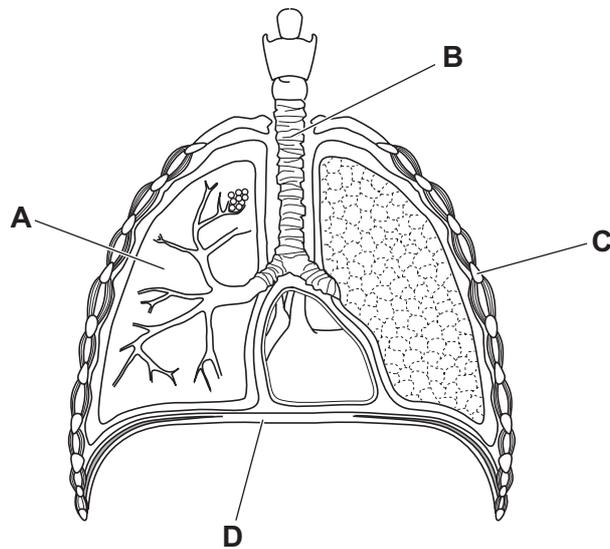
7 The diagram shows a section through the heart.

Which vessel is the pulmonary vein?



8 The diagram shows the human gas exchange system.

Which labelled part is the lung?



9 What is the word equation for aerobic respiration?

A carbon dioxide + glucose \rightarrow oxygen + water

B carbon dioxide + water \rightarrow glucose + oxygen

C glucose + water \rightarrow carbon dioxide + oxygen

D glucose + oxygen \rightarrow carbon dioxide + water

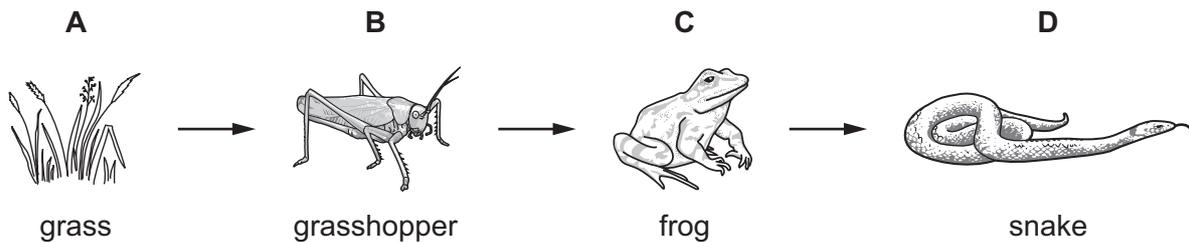
10 What are features of sexual reproduction?

| | fusion of nuclei | nature of offspring |
|----------|------------------|-----------------------|
| A | no | genetically different |
| B | yes | genetically identical |
| C | no | genetically identical |
| D | yes | genetically different |

11 Which structure in a flower produces pollen?

- A** sepal
- B** stamen
- C** stigma
- D** style

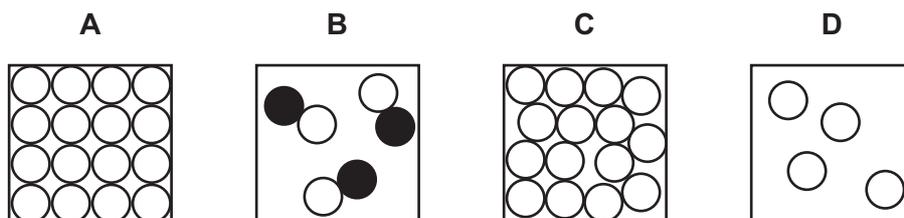
12 What is the primary consumer in the food chain shown?



13 What is an effect of deforestation on the environment?

- A** increased carbon dioxide in the atmosphere
- B** improved soil condition
- C** reduced levels of flooding
- D** increased variety of animals in the area

14 Which diagram represents particles in a gaseous element?



15 What is the relative mass of a proton and the relative charge on a proton?

| | relative mass | relative charge |
|----------|---------------|-----------------|
| A | 0.0005 | +1 |
| B | 0.0005 | -1 |
| C | 1 | -1 |
| D | 1 | +1 |

16 Sodium reacts with chlorine to form sodium chloride.

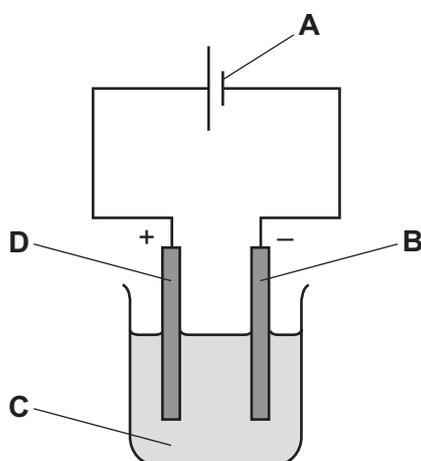
Which statement describes a change that occurs during this reaction?

- A** Each chlorine atom loses one proton.
- B** Each sodium atom loses one electron.
- C** The mass number of each chlorine atom increases.
- D** The atomic number of sodium decreases.

17 Which row shows the formula of sulfuric acid and the number of different elements it contains?

| | formula | number of elements |
|----------|-------------------------|--------------------|
| A | H_2SO_3 | 3 |
| B | H_2SO_3 | 6 |
| C | H_2SO_4 | 3 |
| D | H_2SO_4 | 7 |

18 Which label identifies the cathode in the electrolysis experiment shown?



19 Which reactions are exothermic?

- 1 a reaction that gets cooler
- 2 a reaction that gives out energy
- 3 a reaction that takes in energy
- 4 the combustion of methane

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

20 In which chemical reaction is copper reduced?

- A** anhydrous copper sulfate + water → hydrated copper sulfate
- B** copper carbonate + hydrochloric acid → copper chloride + water + carbon dioxide
- C** copper oxide + hydrogen → copper + water
- D** copper + oxygen → copper oxide

21 Dilute hydrochloric acid is tested with universal indicator and with calcium carbonate.

Which row shows the pH and describes the reaction with calcium carbonate?

| | pH | reaction with calcium carbonate |
|----------|----|---------------------------------|
| A | 2 | a colourless gas is given off |
| B | 2 | no reaction |
| C | 10 | a colourless gas is given off |
| D | 10 | no reaction |

22 The results of two tests on a solution of substance R are shown.

| test | result |
|---|---|
| aqueous sodium hydroxide added | red-brown precipitate formed, insoluble in excess |
| dilute nitric acid added followed by aqueous silver nitrate added | white precipitate formed |

What is R?

- A** iron(II) carbonate
- B** iron(III) carbonate
- C** iron(II) chloride
- D** iron(III) chloride

23 Which statement about Period 2 of the Periodic Table is correct?

- A All the elements are non-metals.
- B There is a change from metal to non-metal, going from left to right.
- C There is a change from non-metal to metal, going from left to right.
- D Most of the elements are metals.

24 Cobalt is a transition element.

What is a property of cobalt?

- A It often acts as a catalyst.
- B It forms white compounds.
- C It has a low density.
- D It is more reactive than Group I metals.

25 Copper oxide and excess carbon are mixed together.

The mass before heating is 12.2 g.

The mixture is heated strongly and allowed to cool.

The mass after heating is 10.4 g.

Why does the mass change?

- A Carbon forms carbon dioxide which then combines with the copper oxide.
- B Carbon reduces the copper oxide and leaves the test-tube as carbon dioxide.
- C Copper oxide loses oxygen, turns into copper and the carbon remains unchanged.
- D Carbon oxidises the copper oxide and leaves the test-tube as carbon dioxide.

26 Water is added separately to anhydrous copper(II) sulfate and to anhydrous cobalt(II) chloride.

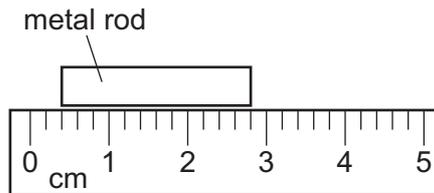
Which row shows the colour changes that occur?

| | copper(II) sulfate | cobalt(II) chloride |
|---|--------------------|---------------------|
| A | blue to white | blue to pink |
| B | blue to white | pink to blue |
| C | white to blue | blue to pink |
| D | white to blue | pink to blue |

27 What is produced when propane, a hydrocarbon, undergoes complete combustion?

- A carbon dioxide and water
- B carbon dioxide only
- C carbon monoxide and water
- D carbon monoxide only

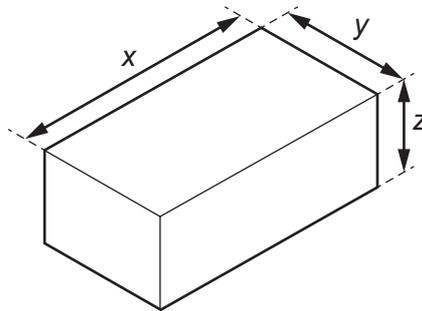
28 The diagram shows a metal rod placed next to a 5 cm scale.



What is the length of the rod?

- A 2.2 cm
 - B 2.4 cm
 - C 2.7 cm
 - D 2.8 cm
- 29 A solid cuboid block of metal has density ρ .

The diagram shows its dimensions.

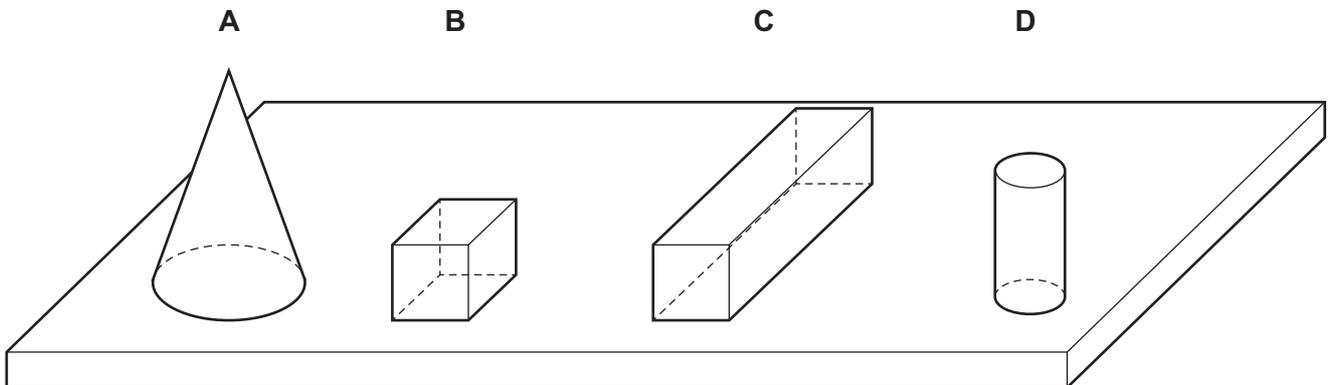


Which expression is used to calculate the mass of the block?

- A $\frac{\rho}{xy}$
- B $\frac{\rho}{xyz}$
- C ρxy
- D ρxyz

- 30 Four solid objects are placed on a horizontal bench. They all have the same weight and they are drawn to the same scale.

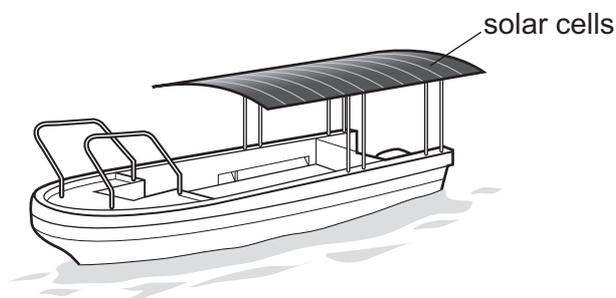
Which object exerts the greatest pressure on the bench?



- 31 Which list of sources of energy contains non-renewable sources only?

- A natural gas, nuclear fission and petroleum
- B natural gas, nuclear fission and wind
- C natural gas, petroleum and wind
- D nuclear fission, petroleum and wind

- 32 Solar cells mounted on a boat produce electrical energy to power the motor.



Which resource does this energy come from?

- A hydroelectric energy
- B light energy
- C tidal energy
- D wind energy

33 The molecules in a liquid are close together.

What are other features of the molecules in a liquid?

- A They are arranged in a regular pattern but change positions with each other.
- B They are arranged in a regular pattern and vibrate about fixed positions.
- C They are arranged randomly and change positions with each other.
- D They are arranged randomly and vibrate about fixed positions.

34 What is the melting point of ice and what is the boiling point of water?

| | melting point /°C | boiling point /°C |
|---|----------------------|----------------------|
| A | -10 | 110 |
| B | 0 | 100 |
| C | 100 | 0 |
| D | 110 | -10 |

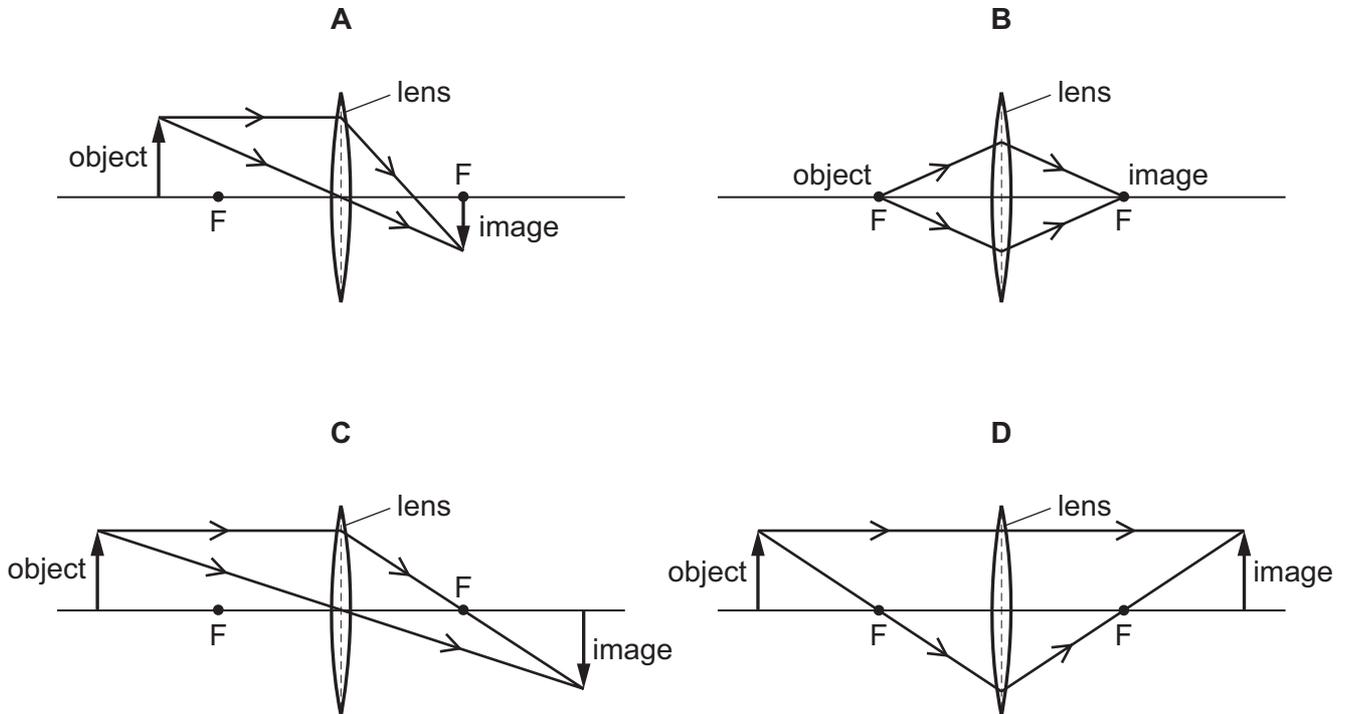
35 Which substance is the best conductor of thermal energy?

- A iron
- B rubber
- C water
- D wood

36 A thin converging lens forms a real image of an object.

In the diagrams, each point labelled F is a principal focus of the lens.

Which diagram shows how the real image of the object is formed?



37 The string of a musical instrument moves regularly up and down several times each minute.

This causes the air to vibrate at the same rate and the vibrations of the air cause a sound.

The number of times the string moves up and down each minute increases.

What happens to the sound produced?

- A** It has a higher frequency.
- B** It has a higher speed.
- C** It has a lower frequency.
- D** It has a lower speed.

- 38 WX and YZ are rods that are uniformly electrically charged.

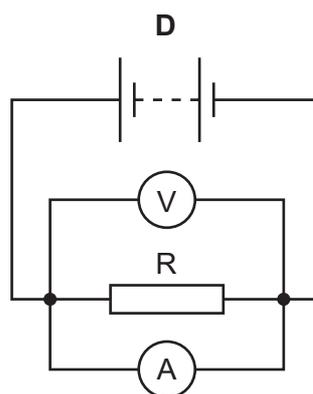
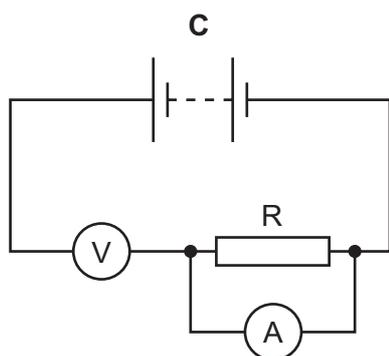
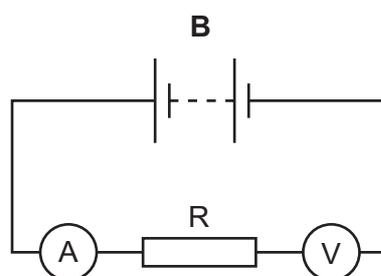
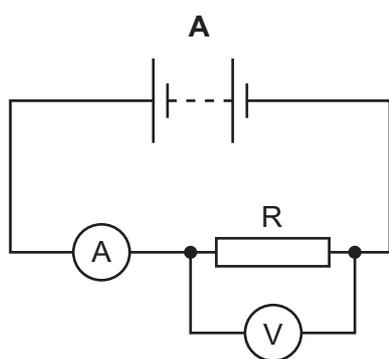


The rods are brought close together and end X repels end Y.

What happens when ends X and Z are brought close together and what happens when ends W and Y are brought close together?

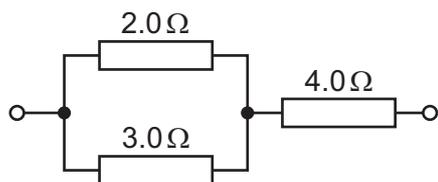
| | X and Z | W and Y |
|----------|---------|---------|
| A | attract | attract |
| B | attract | repel |
| C | repel | attract |
| D | repel | repel |

- 39 Which circuit is used to determine the resistance of resistor R?

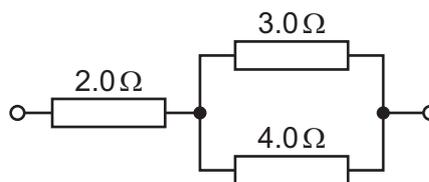


40 Which arrangement of resistors has the smallest combined resistance?

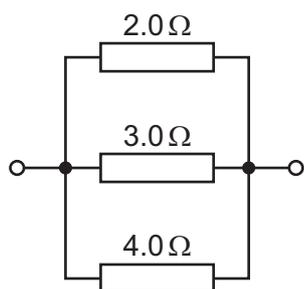
A



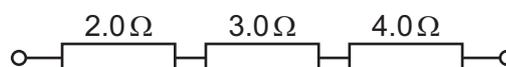
B



C



D



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The Periodic Table of Elements

| | | Group | | | | | | | | | | | | | | | |
|----------------------------|-----------------------------|----------------------------|---------------------------------|---|------------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------------|------------------------------|-----------------------------|
| I | II | III | IV | V | VI | VII | VIII | | | | | | | | | | |
| 3 Li lithium 7 | 4 Be beryllium 9 | 11 Na sodium 23 | 12 Mg magnesium 24 | <div style="border: 1px solid black; padding: 5px; display: inline-block;"> Key atomic number atomic symbol name relative atomic mass </div> | | | | | | | | | | | | | |
| 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 — |

1
H
hydrogen
1

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 dm³ at room temperature and pressure (r.t.p.).