



# Cambridge IGCSE™

## COMBINED SCIENCE

Paper 1 Multiple Choice (Core)

0653/12

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.

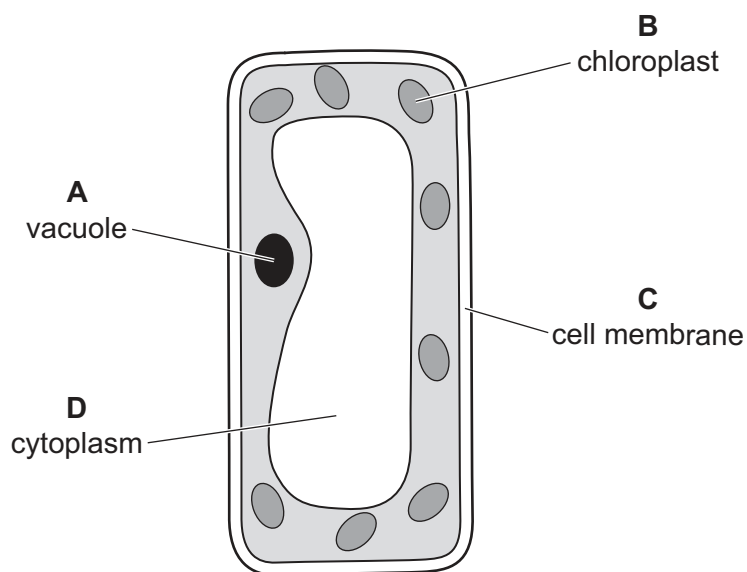
This document has **16** pages. Any blank pages are indicated.

1 Which process removes toxic materials from an organism?

- A digestion
- B egestion
- C excretion
- D respiration

2 The diagram shows a cell as seen with a microscope.

Which label is correct?



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

| name of test | colour obtained |
|--------------|-----------------|
| iodine       | brown           |
| Benedict's   | orange          |
| biuret       | blue            |

Which nutrients does the food contain?

|   | reducing sugar | starch | protein |
|---|----------------|--------|---------|
| A | ✓              | ✓      | x       |
| B | ✓              | x      | x       |
| C | x              | ✓      | ✓       |
| D | x              | x      | ✓       |

- 4 The table shows the time taken for an enzyme-controlled reaction to be completed at different pH values.

| pH                                          | 6   | 7   | 8   | 9   |
|---------------------------------------------|-----|-----|-----|-----|
| time taken for reaction to be completed / s | 170 | 150 | 120 | 100 |

At which pH value does the enzyme work best?

- A** pH6                      **B** pH7                      **C** pH8                      **D** pH9

- 5 In which order does food pass through parts of the alimentary canal?

- A** oesophagus → anus → large intestine  
**B** small intestine → oesophagus → stomach  
**C** small intestine → large intestine → anus  
**D** stomach → large intestine → small intestine

- 6 A sample of blood is taken from a person who often gets infections.

The blood is also slow to clot.

Which blood components are likely to be at a lower level than normal?

- 1 platelets  
 2 red blood cells  
 3 white blood cells

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

- 7 From which lung structure does oxygen pass into the blood?

- A** alveoli  
**B** bronchi  
**C** bronchioles  
**D** trachea

8 Which word is missing from the word equation for respiration?

..... + oxygen → carbon dioxide + water

- A glucose
- B glycogen
- C protein
- D starch

9 Which physical changes occur in response to a fear stimulus?

|   | adrenaline<br>concentration<br>in the blood | pulse rate | size of pupil |
|---|---------------------------------------------|------------|---------------|
| A | decreases                                   | increases  | narrower      |
| B | decreases                                   | decreases  | wider         |
| C | increases                                   | increases  | wider         |
| D | increases                                   | decreases  | narrower      |

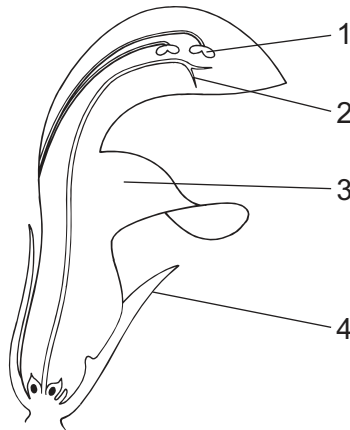
10 Which word describes the growth of a plant towards light?

- A gravitropism
- B movement
- C photosynthesis
- D phototropism

11 Which row describes asexual reproduction?

|   | number of<br>parents involved | offspring genetically<br>identical to each other |
|---|-------------------------------|--------------------------------------------------|
| A | 1                             | yes                                              |
| B | 1                             | no                                               |
| C | 2                             | yes                                              |
| D | 2                             | no                                               |

12 The diagram shows a section through an insect-pollinated flower.



Which labels are correct?

|          | anther | petal | sepal | stigma |
|----------|--------|-------|-------|--------|
| <b>A</b> | 1      | 3     | 4     | 2      |
| <b>B</b> | 1      | 4     | 3     | 2      |
| <b>C</b> | 2      | 3     | 4     | 1      |
| <b>D</b> | 2      | 4     | 3     | 1      |

13 What is the journey of a sperm cell during sexual intercourse?

- A** testis → urethra → uterus → oviduct
- B** testis → urethra → oviduct → uterus
- C** urethra → sperm duct → uterus → vagina
- D** urethra → vagina → oviduct → uterus

14 The formulae of three substances are shown.

| substance | formula          |
|-----------|------------------|
| methane   | CH <sub>4</sub>  |
| water     | H <sub>2</sub> O |
| oxygen    | O <sub>2</sub>   |

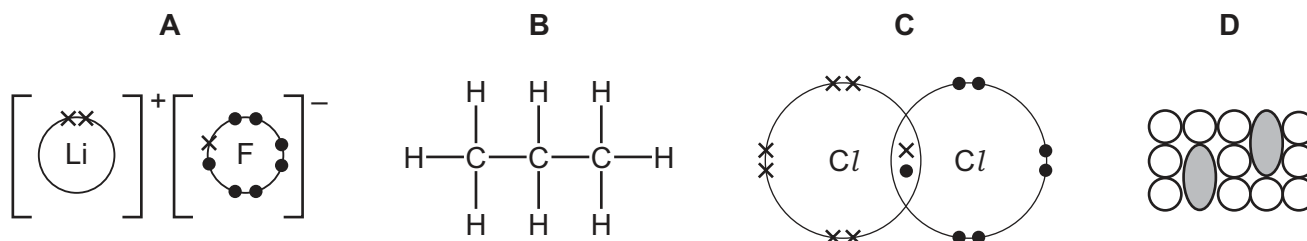
Which statement is correct?

- A** Methane is made from five different types of atom.
- B** Methane, water and oxygen are molecules.
- C** Only methane and water are molecules.
- D** Oxygen is made from two different types of atom.

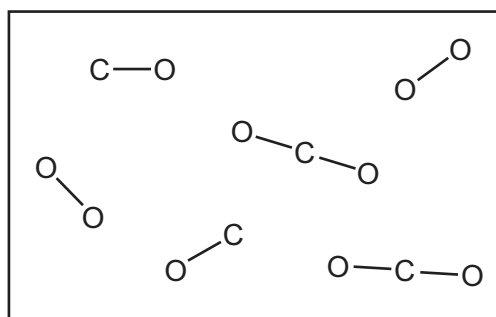
15 What is the definition of nucleon number?

- A the number of protons in an atom
- B the number of electrons in an atom
- C the total number of electrons and neutrons in an atom
- D the total number of neutrons and protons in an atom

16 Which structure represents an ionic compound?



17 A mixture of six gas molecules is shown.



Which statement about the mixture is correct?

- A It contains carbon dioxide and oxygen only.
- B It contains carbon monoxide and oxygen only.
- C It contains three different elements.
- D It contains two molecules of carbon dioxide.

18 Molten lead(II) bromide is electrolysed using inert electrodes.

What are the products at each electrode?

|          | anode        | cathode      |
|----------|--------------|--------------|
| <b>A</b> | bromide ions | lead         |
| <b>B</b> | bromine gas  | lead         |
| <b>C</b> | lead         | bromine gas  |
| <b>D</b> | lead         | bromide ions |

19 The initial and final temperatures of four different reactions are measured.

The results are shown.

Which reaction is the most exothermic?

|          | initial<br>temperature<br>/°C | final<br>temperature<br>/°C |
|----------|-------------------------------|-----------------------------|
| <b>A</b> | 21                            | 18                          |
| <b>B</b> | 21                            | 27                          |
| <b>C</b> | 23                            | 28                          |
| <b>D</b> | 24                            | 17                          |

20 In which reactions is the underlined substance oxidised?

- 1 iron when it rusts
- 2 methane when it burns in air
- 3 copper oxide when it reacts with carbon

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

21 Dilute sulfuric acid reacts with aqueous potassium hydroxide.

What are the products of this reaction?

|          | potassium<br>hydroxide | potassium<br>sulfate | carbon<br>dioxide | water |
|----------|------------------------|----------------------|-------------------|-------|
| <b>A</b> | ✓                      | x                    | ✓                 | ✓     |
| <b>B</b> | x                      | ✓                    | x                 | ✓     |
| <b>C</b> | x                      | ✓                    | ✓                 | ✓     |
| <b>D</b> | x                      | ✓                    | x                 | x     |

key  
✓ = yes  
x = no

**22** 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, add dilute aqueous silver nitrate | white precipitate formed                             |

What is P?

- A** aluminium carbonate
- B** aluminium sulfate
- C** ammonium chloride
- D** ammonium nitrate

**23** Period 3 of the Periodic Table is shown.

|    |    |    |    |   |   |    |    |
|----|----|----|----|---|---|----|----|
| Na | Mg | Al | Si | P | S | Cl | Ar |
|----|----|----|----|---|---|----|----|

Which statement about these elements is correct?

- A** All the elements are metals.
- B** All the elements are non-metals.
- C** Metallic character decreases from Na to Ar.
- D** Proton number decreases from Na to Ar.

**24** Which statement about noble gases is correct?

- A** Helium is used to fill filament lamps.
- B** They are all diatomic gases.
- C** Argon and helium are found in clean air.
- D** They are all in Group VII of the Periodic Table.

**25** Why are gold alloys, rather than pure gold, used to make jewellery?

- A** Alloys are better electrical conductors.
- B** Alloys are less likely to corrode.
- C** Alloys are harder.
- D** Alloys are less dense.

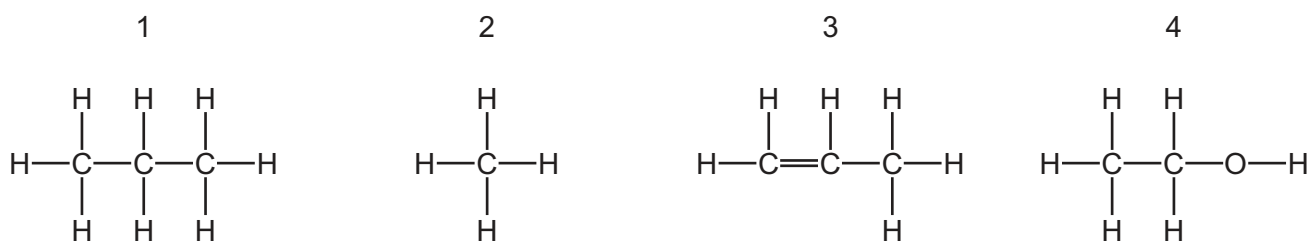
26 Four substances are listed.

- 1 aqueous sodium sulfate
- 2 dilute sulfuric acid
- 3 solid iodine
- 4 white copper(II) sulfate

Which substances turn cobalt(II) chloride from blue to pink?

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

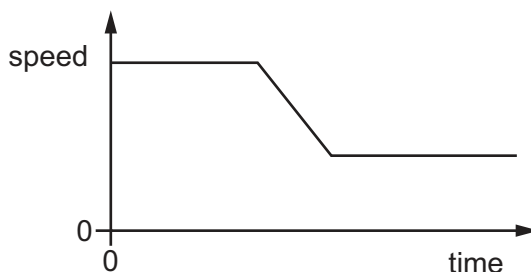
27 The structures of four organic compounds are shown.



Which compounds are alkanes?

- A** 1, 2 and 3      **B** 1 and 2 only      **C** 1, 3 and 4      **D** 3 and 4 only

28 The diagram shows a speed–time graph for part of the journey of a car.



Which statement about the part of the journey shown is correct?

- A** The car travels at a constant speed then decelerates and moves at a slower speed.  
**B** The car travels at a constant speed then decelerates to rest.  
**C** The car travels at a constant speed then reverses its direction.  
**D** The car travels at an increasing speed then slows down.

- 29 A vehicle is taken from the Earth to the Moon where the gravitational field strength is smaller.

How do the mass and the weight of the vehicle on the Moon compare with their values on the Earth?

- A smaller mass and smaller weight
- B smaller mass and the same weight
- C the same mass and smaller weight
- D the same mass and the same weight

- 30 Which statement about air resistance is correct?

- A It acts in the same direction as the direction of motion.
- B It always acts in the opposite direction to the force of gravity.
- C It is a form of friction.
- D It only acts on stationary objects.

- 31 The work done by a force on an object is calculated using the magnitude of the force and only one other quantity.

What is this other quantity?

- A the acceleration of the object
- B the distance moved by the object in the direction of the force
- C the speed of the object
- D the time for which the force acts on the object

- 32 Which form of energy is **not** a form of potential energy?

- A chemical
- B elastic
- C gravitational
- D sound

- 33 What happens as a liquid starts to evaporate?

- A The mass of the remaining liquid increases.
- B The mass of the remaining liquid is constant.
- C The temperature of the remaining liquid decreases.
- D The temperature of the remaining liquid increases.

- 34** The metal lid on a glass jar is difficult to unscrew.

The lid is unscrewed more easily after it is held under hot water.

What is the reason for this?

- A** The jar contracts more than the lid.
- B** The jar expands more than the lid.
- C** The lid contracts more than the jar.
- D** The lid expands more than the jar.

- 35** The word 'LIGHT' is printed on a piece of paper.

The piece of paper is held in front of a vertical mirror with the word 'LIGHT' upright.

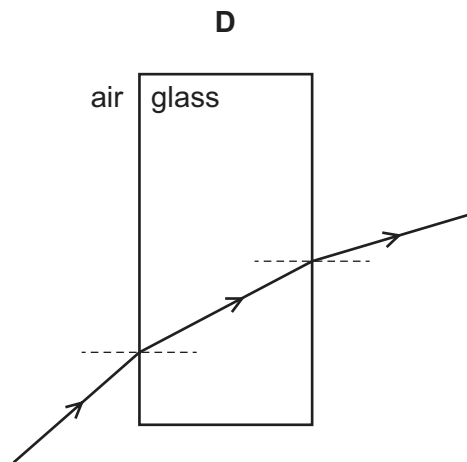
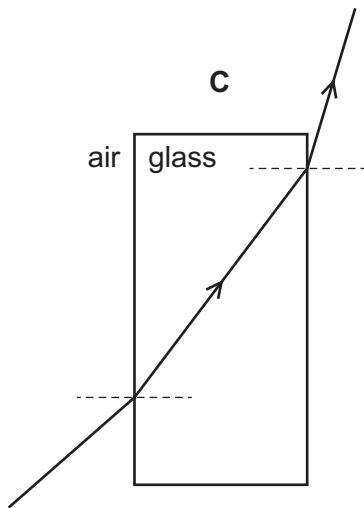
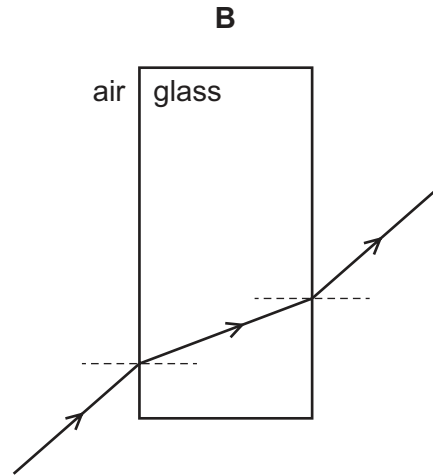
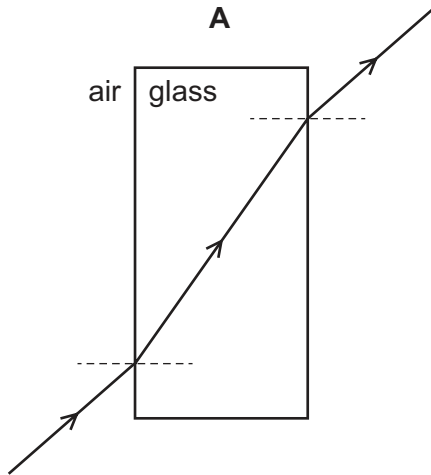
A person looks at the mirror and sees an image of the word.

What does the image look like?

- |          |          |          |          |
|----------|----------|----------|----------|
| <b>A</b> | <b>B</b> | <b>C</b> | <b>D</b> |
| LIGHT    | THGIJ    | LHGIJ    | FIHIL    |

**36** Light passes through a parallel-sided block of glass.

Which diagram shows how the light passes through the block?

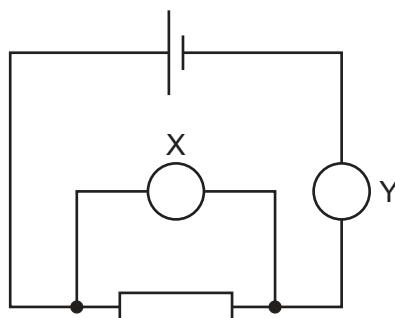


**37** Which change makes the pitch of a sound higher?

- A** decreasing the amplitude of the sound wave
- B** decreasing the frequency of the sound wave
- C** increasing the amplitude of the sound wave
- D** increasing the frequency of the sound wave

38 The diagram shows a cell connected to a resistor and two meters, X and Y.

The circuit is used when determining the resistance of the resistor.

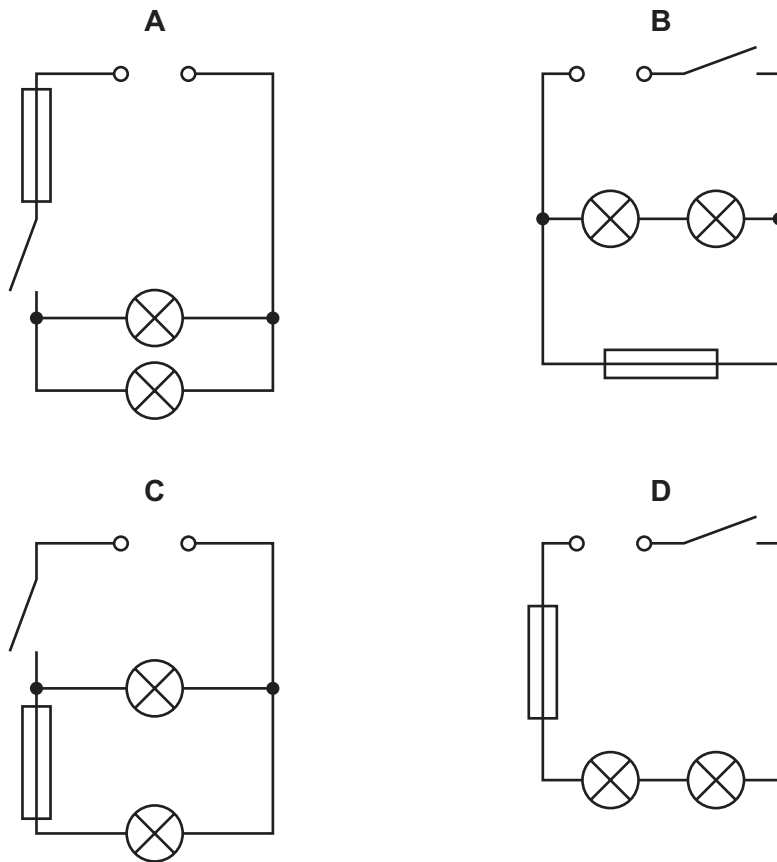


What are the quantities measured by meters X and Y, and what are their correct units?

|          | meter X  |      | meter Y  |      |
|----------|----------|------|----------|------|
|          | quantity | unit | quantity | unit |
| <b>A</b> | current  | A    | p.d.     | V    |
| <b>B</b> | current  | V    | p.d.     | A    |
| <b>C</b> | p.d.     | A    | current  | V    |
| <b>D</b> | p.d.     | V    | current  | A    |

- 39** A circuit contains two lamps connected in parallel. One fuse protects both lamps and one switch operates both lamps.

Which circuit diagram shows this arrangement?



- 40** An electrical appliance with a resistance of  $600\ \Omega$  is connected to a  $240\ \text{V}$  supply.

Which fuse rating is appropriate to protect the appliance and the wires from overheating if a fault occurs?

- A**  $0.04\ \text{A}$       **B**  $0.5\ \text{A}$       **C**  $5\ \text{A}$       **D**  $13\ \text{A}$

**BLANK PAGE**

---

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at [www.cambridgeinternational.org](http://www.cambridgeinternational.org) after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

# The Periodic Table of Elements

| Group                  |                         |                                                                              |                             |                         |                          |                         |                          |                          |                            |                           |                           |                         |                         |                         |                           |                          |                         |  |
|------------------------|-------------------------|------------------------------------------------------------------------------|-----------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|----------------------------|---------------------------|---------------------------|-------------------------|-------------------------|-------------------------|---------------------------|--------------------------|-------------------------|--|
| I                      | II                      | Key                                                                          |                             |                         |                          |                         |                          |                          |                            |                           |                           | III                     | IV                      | V                       | VI                        | VII                      | VIII                    |  |
|                        |                         | <div>1Hhydrogen1</div>                                                       |                             |                         |                          |                         |                          |                          |                            |                           |                           |                         |                         |                         |                           |                          |                         |  |
| 3Li<br>lithium<br>7    | 4Be<br>beryllium<br>9   | <div>atomic number<br/>atomic symbol<br/>name<br/>relative atomic mass</div> |                             |                         |                          |                         |                          |                          |                            |                           |                           |                         |                         |                         |                           |                          |                         |  |
| 11Na<br>sodium<br>23   | 12Mg<br>magnesium<br>24 |                                                                              |                             |                         |                          |                         |                          |                          |                            |                           |                           | 5B<br>boron<br>11       | 6C<br>carbon<br>12      | 7N<br>nitrogen<br>14    | 8O<br>oxygen<br>16        | 9F<br>fluorine<br>19     | 10Ne<br>neon<br>20      |  |
|                        |                         |                                                                              |                             |                         |                          |                         |                          |                          |                            |                           |                           | 13Al<br>aluminium<br>27 | 14Si<br>silicon<br>28   | 15P<br>phosphorus<br>31 | 16S<br>sulfur<br>32       | 17Cl<br>chlorine<br>35.5 | 18Ar<br>argon<br>40     |  |
| 19K<br>potassium<br>39 | 20Ca<br>calcium<br>40   | 21Sc<br>scandium<br>45                                                       | 22Ti<br>titanium<br>48      | 23V<br>vanadium<br>51   | 24Cr<br>chromium<br>52   | 25Mn<br>manganese<br>55 | 26Fe<br>iron<br>56       | 27Co<br>cobalt<br>59     | 28Ni<br>nickel<br>59       | 29Cu<br>copper<br>64      | 30Zn<br>zinc<br>65        | 31Ga<br>gallium<br>70   | 32Ge<br>germanium<br>73 | 33As<br>arsenic<br>75   | 34Se<br>selenium<br>79    | 35Br<br>bromine<br>80    | 36Kr<br>krypton<br>84   |  |
| 37Rb<br>rubidium<br>85 | 38Sr<br>strontium<br>88 | 39Y<br>yttrium<br>89                                                         | 40Zr<br>zirconium<br>91     | 41Nb<br>niobium<br>93   | 42Mo<br>molybdenum<br>96 | 43Tc<br>technetium<br>— | 44Ru<br>ruthenium<br>101 | 45Rh<br>rhodium<br>103   | 46Pd<br>palladium<br>106   | 47Ag<br>silver<br>108     | 48Cd<br>cadmium<br>112    | 49In<br>indium<br>115   | 50Sn<br>tin<br>119      | 51Sb<br>antimony<br>122 | 52Te<br>tellurium<br>128  | 53I<br>iodine<br>127     | 54Xe<br>xenon<br>131    |  |
| 55Cs<br>caesium<br>133 | 56Ba<br>barium<br>137   | 57–71lanthanoids                                                             | 72Hf<br>hafnium<br>178      | 73Ta<br>tantalum<br>181 | 74W<br>tungsten<br>184   | 75Re<br>rhenium<br>186  | 76Os<br>osmium<br>190    | 77Ir<br>iridium<br>192   | 78Pt<br>platinum<br>195    | 79Au<br>gold<br>197       | 80Hg<br>mercury<br>201    | 81Tl<br>thallium<br>204 | 82Pb<br>lead<br>207     | 83Bi<br>bismuth<br>209  | 84Po<br>polonium<br>—     | 85At<br>astatine<br>—    | 86Rn<br>radon<br>—      |  |
| 87Fr<br>francium<br>—  | 88Ra<br>radium<br>—     | 89–103actinoids                                                              | 104Rf<br>rutherfordium<br>— | 105Db<br>dubnium<br>—   | 106Sg<br>seaborgium<br>— | 107Bh<br>bohrium<br>—   | 108Hs<br>hassium<br>—    | 109Mt<br>meitnerium<br>— | 110Ds<br>darmstadtium<br>— | 111Rg<br>roentgenium<br>— | 112Cn<br>copernicium<br>— | 113Nh<br>nihonium<br>—  | 114Fl<br>flerovium<br>— | 115Mc<br>moscovium<br>— | 116Lv<br>livermorium<br>— | 117Ts<br>tennessine<br>— | 118Og<br>oganesson<br>— |  |

|             |    |    |           |     |    |    |         |     |    |    |              |     |    |    |           |     |    |    |            |   |    |    |           |     |    |    |           |     |    |    |            |     |    |    |           |     |    |    |             |     |    |    |             |     |     |    |         |     |     |    |             |     |     |    |           |     |     |    |            |     |
|-------------|----|----|-----------|-----|----|----|---------|-----|----|----|--------------|-----|----|----|-----------|-----|----|----|------------|---|----|----|-----------|-----|----|----|-----------|-----|----|----|------------|-----|----|----|-----------|-----|----|----|-------------|-----|----|----|-------------|-----|-----|----|---------|-----|-----|----|-------------|-----|-----|----|-----------|-----|-----|----|------------|-----|
| 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 | euroium   | 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 | —   |

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