



# Cambridge IGCSE™

## COMBINED SCIENCE

0653/12

Paper 1 Multiple Choice (Core)

October/November 2020

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. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Blank pages are indicated.



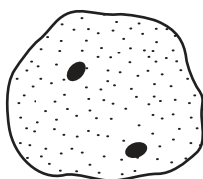
## 2

- 1 A plant is placed next to a window. After a few days, its leaves face the light.

Which characteristic is this displaying?

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

- 2 The diagram shows a cell from an animal's liver.



In what way does this cell differ from a typical animal cell?

- A It contains a central vacuole.
  - B It contains cytoplasm.
  - C It contains two nuclei.
  - D It has a cell wall.
- 3 Particles move from one area to another by diffusion.

Which row is correct about this movement?

|          | concentration of particles in area <b>from</b> which they move | concentration of particles in area <b>to</b> which they move | movement of molecules |
|----------|----------------------------------------------------------------|--------------------------------------------------------------|-----------------------|
| <b>A</b> | high                                                           | high                                                         | in a pattern          |
| <b>B</b> | high                                                           | low                                                          | random                |
| <b>C</b> | low                                                            | high                                                         | random                |
| <b>D</b> | low                                                            | low                                                          | in a pattern          |

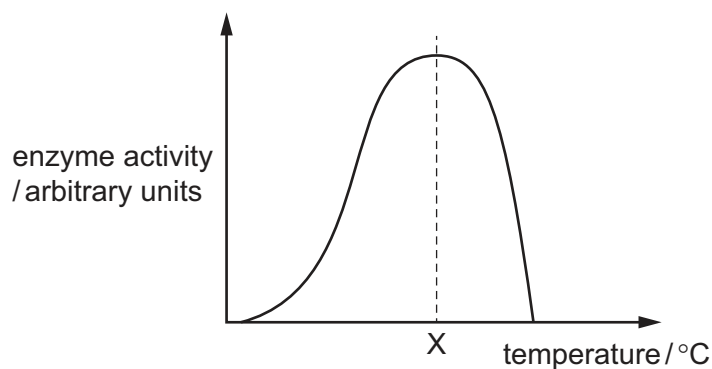
**3**

- 4** A student has samples of food and wants to test them for starch.

What should the student use to do this?

- A** Benedict's solution
- B** iodine solution
- C** limewater
- D** water and ethanol

- 5** The diagram shows how the activity of an enzyme changes with temperature.



This enzyme works in the human body.

What is the most likely value of temperature X?

- A** 10 °C
- B** 40 °C
- C** 70 °C
- D** 100 °C

- 6** Corals are animals found in the sea. They can only survive if they live in a close relationship with algae. Algae can photosynthesise.

What do the algae produce that corals can use to survive?

|          | carbon dioxide | chlorophyll | glucose | oxygen |
|----------|----------------|-------------|---------|--------|
| <b>A</b> | ✓              | ✓           | x       | x      |
| <b>B</b> | ✓              | x           | x       | ✓      |
| <b>C</b> | x              | ✓           | ✓       | x      |
| <b>D</b> | x              | x           | ✓       | ✓      |

## 4

- 7 Some undigested food passes out of the digestive system as faeces.

What is this process?

- A absorption
- B digestion
- C egestion
- D ingestion

- 8 Which breakdown processes occur inside cells, and which occur outside cells?

|   | large molecules to small molecules for absorption | breakdown of glucose to release energy |
|---|---------------------------------------------------|----------------------------------------|
| A | inside                                            | inside                                 |
| B | inside                                            | outside                                |
| C | outside                                           | inside                                 |
| D | outside                                           | outside                                |

- 9 Which blood vessel carries blood from the heart to the lungs?

- A aorta
- B pulmonary artery
- C pulmonary vein
- D vena cava

- 10 What are the effects of adrenaline on the human body?

|   | breathing rate | pulse rate |
|---|----------------|------------|
| A | decreases      | decreases  |
| B | decreases      | increases  |
| C | increases      | decreases  |
| D | increases      | increases  |

5

11 Which row describes asexual reproduction?

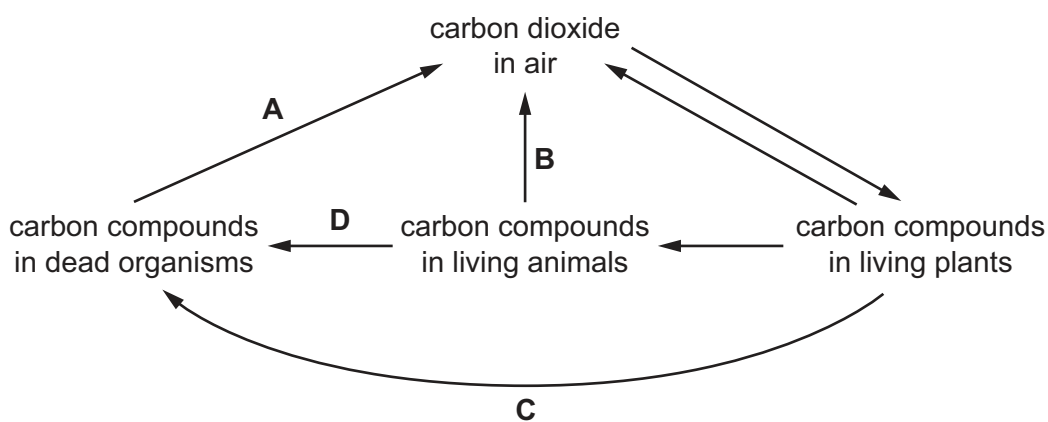
|          | number of parents | a zygote is produced | offspring identical to the parent |
|----------|-------------------|----------------------|-----------------------------------|
| <b>A</b> | 1                 | no                   | yes                               |
| <b>B</b> | 1                 | yes                  | no                                |
| <b>C</b> | 2                 | no                   | yes                               |
| <b>D</b> | 2                 | yes                  | no                                |

12 On which part of a flower is pollen deposited during pollination?

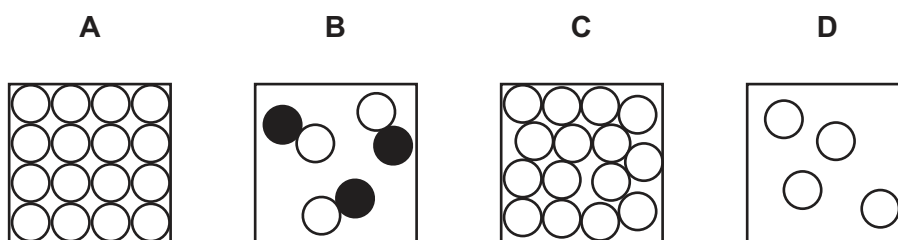
- A** ovary
- B** stamen
- C** stigma
- D** style

13 The diagram shows part of the carbon cycle.

Which arrow represents respiration by decomposers?



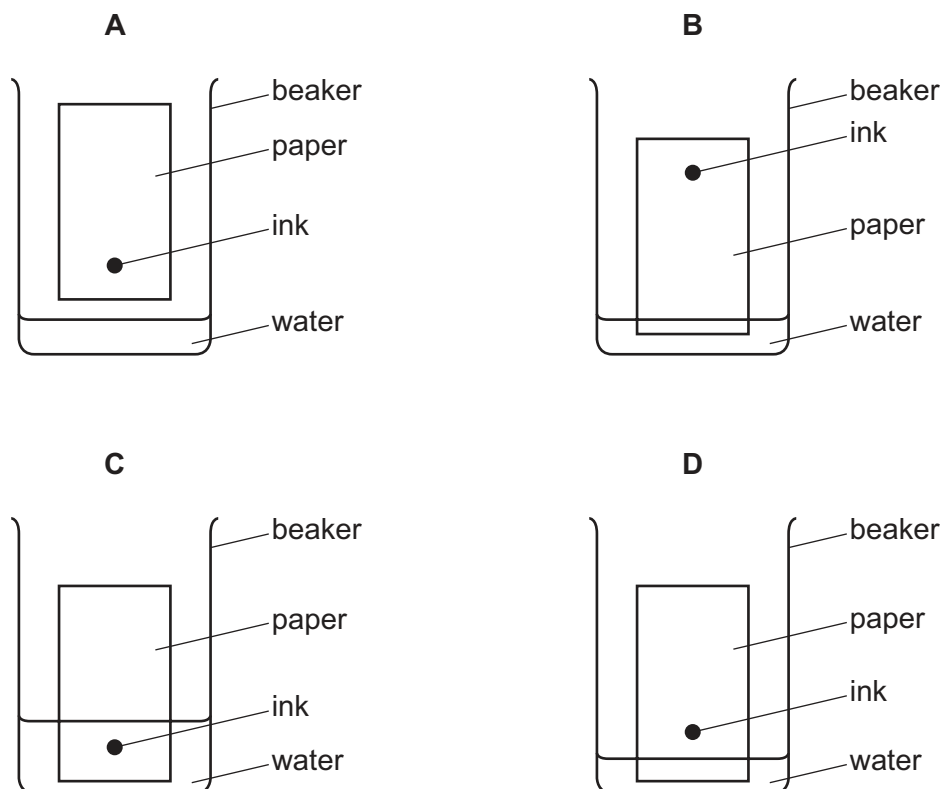
14 Which diagram represents particles in a gaseous element?



6

**15** Chromatography separates ink into different colours.

Which diagram shows how the apparatus is set up?



**16** 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

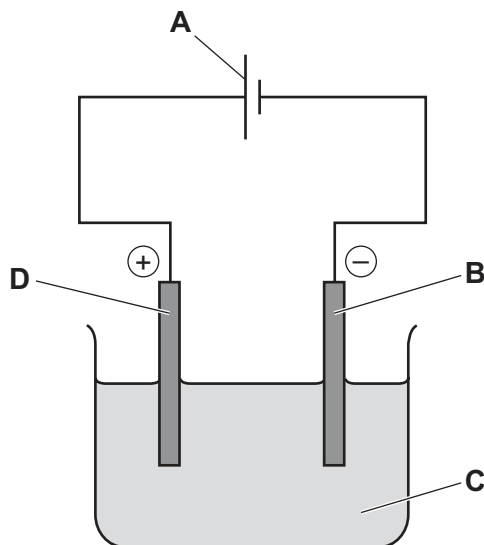
**17** Which equation for the complete combustion of propane,  $C_3H_8$ , is correct?

- A**  $C_3H_8 + 2O_2 \rightarrow 3C + 4H_2O$
- B**  $2C_3H_8 + 3O_2 \rightarrow 6CO + 8H_2$
- C**  $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
- D**  $C_3H_8 + 3O_2 \rightarrow 3CO_2 + 4H_2$

7

18 The diagram shows the electrolysis of molten lead(II) bromide.

Which label shows the cathode?



19 Which temperature changes occur during exothermic and endothermic reactions?

|          | exothermic | endothermic |
|----------|------------|-------------|
| <b>A</b> | decreases  | increases   |
| <b>B</b> | decreases  | no change   |
| <b>C</b> | increases  | decreases   |
| <b>D</b> | increases  | no change   |

20 Magnesium reacts with zinc oxide to form magnesium oxide and zinc.

Which substance is reduced in this reaction?

- A** magnesium
- B** magnesium oxide
- C** zinc
- D** zinc oxide

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

Which row shows the results?

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

**22** Acid X reacts with metal Y.

A colourless gas is given off and a pale green solution is produced.

Two tests are carried out on the solution.

| test | reagent(s) added                       | result            |
|------|----------------------------------------|-------------------|
| 1    | aqueous silver nitrate and nitric acid | white precipitate |
| 2    | aqueous sodium hydroxide               | green precipitate |

What are acid X and metal Y?

|          | acid         | metal |
|----------|--------------|-------|
| <b>A</b> | hydrochloric | iron  |
| <b>B</b> | hydrochloric | zinc  |
| <b>C</b> | sulfuric     | iron  |
| <b>D</b> | sulfuric     | zinc  |

**23** Which row describes a Group I element?

|          | metal or non-metal | reaction with water |
|----------|--------------------|---------------------|
| <b>A</b> | metal              | fast reaction       |
| <b>B</b> | metal              | no reaction         |
| <b>C</b> | non-metal          | fast reaction       |
| <b>D</b> | non-metal          | no reaction         |

**24** Substance X is a coloured solid.

Substance X acts as a catalyst for the reaction between zinc and dilute sulfuric acid.

Molten X can be electrolysed.

What is X?

- A** a Group I compound
- B** a Group I metal
- C** a transition metal compound
- D** a transition metal

**25** Which method is used to extract copper from copper(II) oxide?

- A** dissolving copper(II) oxide in hydrochloric acid and then filtering
- B** dissolving copper(II) oxide in water and then filtering
- C** heating the copper(II) oxide
- D** heating the copper(II) oxide mixed with carbon

**26** Which processes are used in water treatment?

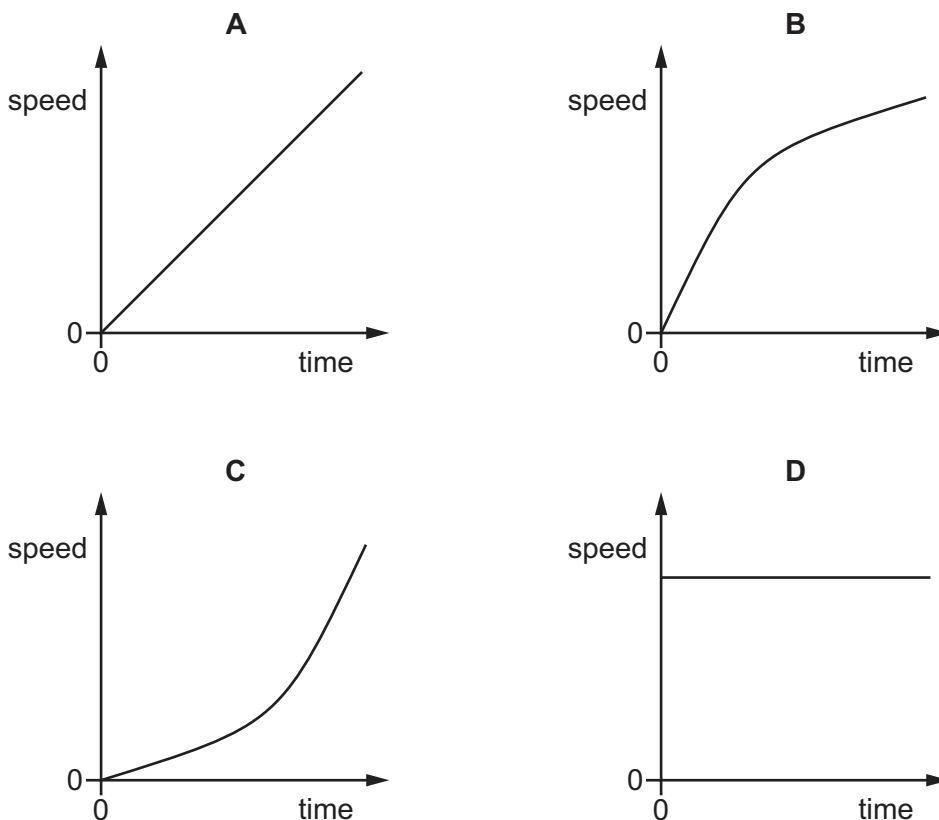
- 1 chlorination
- 2 cracking
- 3 filtration

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

**27** Which statement describes a hydrocarbon?

- A** a compound that burns to form carbon dioxide and hydrogen
- B** a compound that contains carbon and hydrogen only
- C** a compound that only contains ionic bonds
- D** a compound that reacts easily with metals

**28** Which speed–time graph represents motion for which the acceleration is constant but **not** zero?



**29** A solid metal cube of side 5.0 cm has a mass of 250 g.

What is the density of the metal?

- A** 0.50 g/cm<sup>3</sup>    **B** 2.0 g/cm<sup>3</sup>    **C** 10 g/cm<sup>3</sup>    **D** 50 g/cm<sup>3</sup>

**30** A car powered by a petrol (gasoline) engine is driven along a horizontal road.

How is energy stored in the petrol and what form of energy does the car have because it is moving?

|          | energy in petrol   | energy of moving car    |
|----------|--------------------|-------------------------|
| <b>A</b> | chemical potential | gravitational potential |
| <b>B</b> | chemical potential | kinetic                 |
| <b>C</b> | electrical         | gravitational potential |
| <b>D</b> | electrical         | kinetic                 |

**31** The molecules of 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.

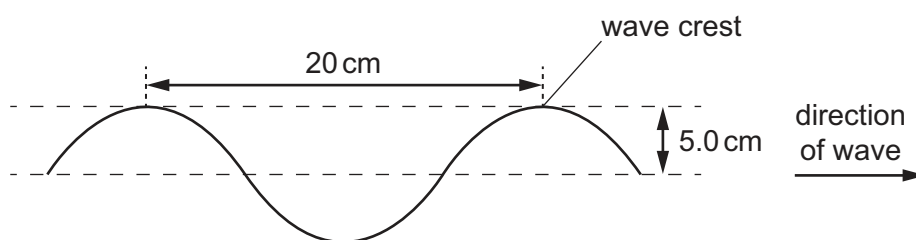
**32** In which states of matter can convection occur?

|          | in a solid | in a liquid | in a gas |
|----------|------------|-------------|----------|
| <b>A</b> | no         | no          | yes      |
| <b>B</b> | no         | yes         | yes      |
| <b>C</b> | yes        | no          | no       |
| <b>D</b> | yes        | yes         | no       |

**33** The diagram shows a section of a rope.

Four wave crests pass a point on the rope every second.

Each wave crest travels 80 cm in one second.



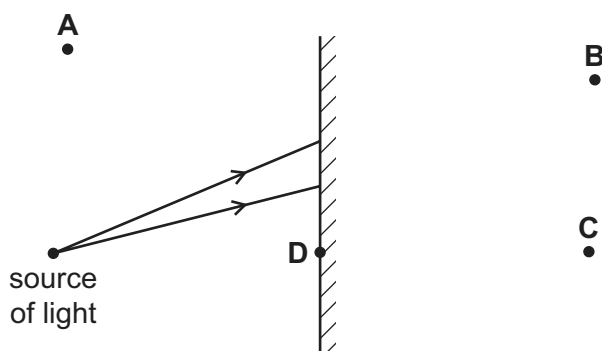
What is the speed of the wave?

- A** 4.0 cm/s
- B** 5.0 cm/s
- C** 20 cm/s
- D** 80 cm/s

12

- 34 A source of light is placed in front of a plane mirror.

Which labelled point shows the position of the image of the source?



- 35 Radio waves, visible light and X-rays all travel in a vacuum.

Which wave travels at the greatest speed?

- A radio waves
  - B visible light
  - C X-rays
  - D they all travel at the same speed
- 36 Which is **not** able to transmit sound waves?
- A a gas
  - B a liquid
  - C a solid
  - D a vacuum
- 37 A positively charged sphere hangs from an insulating thread.

A student brings a rod close to the sphere.

The sphere moves away from the rod.

Which conclusion can the student draw about the rod?

- A It is charged but it is not possible to know whether it is negatively or positively charged.
- B It is negatively charged.
- C It is not charged.
- D It is positively charged.

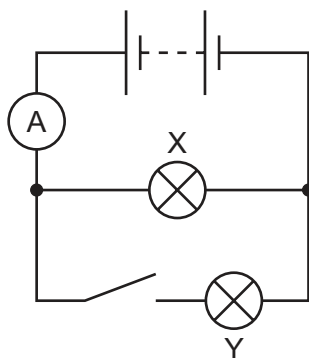
**38** A power supply causes a current in a circuit.

The electromotive force (e.m.f.) of the power supply and the resistance of the circuit are both changed.

Which pair of changes **must** result in a smaller current in the circuit?

|          | e.m.f.    | resistance |
|----------|-----------|------------|
| <b>A</b> | decreased | decreased  |
| <b>B</b> | decreased | increased  |
| <b>C</b> | increased | decreased  |
| <b>D</b> | increased | increased  |

**39** The diagram shows an electric circuit. The switch is closed and both lamps are lit.



Lamp Y is now switched off. Lamp X remains lit.

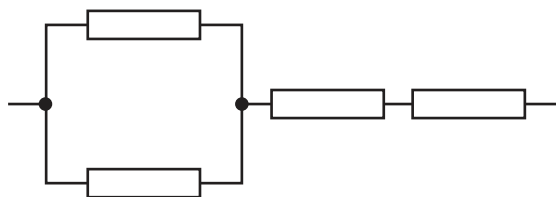
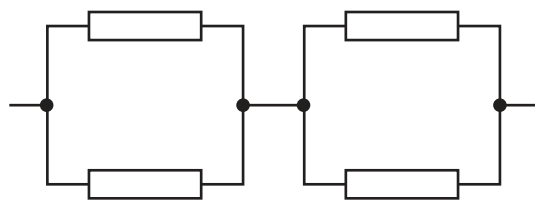
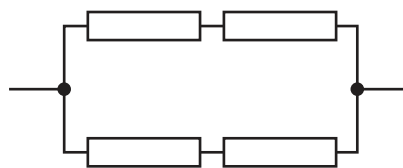
What happens to the reading on the ammeter?

- A** It decreases to zero.
- B** It decreases but to a value greater than zero.
- C** It stays the same.
- D** It increases.

14

40 The diagrams show four identical resistors connected in different combinations.

Which combination has the greatest combined resistance?

**A****B****C****D**

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The Periodic Table of Elements

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

lanthanoids

actinoids

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