



# Cambridge IGCSE™

## CHEMISTRY

0620/11

Paper 1 Multiple Choice (Core)

October/November 2025

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 describes the movement of a substance **very slowly** from an area of high concentration to an area of low concentration?
- A** a liquid being frozen
- B** a solid melting
- C** a substance diffusing through a liquid
- D** a substance diffusing through the air
- 2 The atomic number and nucleon number of a potassium atom are shown.

|                |    |
|----------------|----|
| atomic number  | 19 |
| nucleon number | 39 |

How many protons, neutrons and electrons are in the potassium ion,  $K^+$ , which is formed from this potassium atom?

|          | protons | neutrons | electrons |
|----------|---------|----------|-----------|
| <b>A</b> | 19      | 20       | 18        |
| <b>B</b> | 19      | 20       | 20        |
| <b>C</b> | 20      | 19       | 18        |
| <b>D</b> | 20      | 19       | 19        |

- 3 Magnesium is in Group II and Period 3 of the Periodic Table.

Which row shows the charge on a magnesium ion and the electronic configuration of a magnesium ion?

|          | charge | electronic configuration |
|----------|--------|--------------------------|
| <b>A</b> | +2     | 2,8                      |
| <b>B</b> | +2     | 2,8,2                    |
| <b>C</b> | -2     | 2,8                      |
| <b>D</b> | -2     | 2,8,2                    |

- 4 Sodium is in Group I of the Periodic Table.

Chlorine is in Group VII of the Periodic Table.

Sodium and chlorine combine to form a compound.

Which statement about the combination of sodium and chlorine atoms is correct?

- A Both sodium and chlorine lose electrons.
- B Both sodium and chlorine gain electrons.
- C Sodium loses electrons and chlorine gains electrons.
- D Sodium gains electrons and chlorine loses electrons.

- 5 Strontium nitrate is an ionic compound.

Cyclohexane is a covalent compound.

Which row describes a property of each compound?

|   | strontium nitrate                        | cyclohexane                     |
|---|------------------------------------------|---------------------------------|
| A | conducts electricity in aqueous solution | low boiling point               |
| B | low melting point                        | insoluble in water              |
| C | soluble in water                         | conducts electricity when solid |
| D | conducts electricity when solid          | high melting point              |

- 6 Which element forms covalent bonds with hydrogen?

- A magnesium
- B neon
- C nitrogen
- D sodium

- 7 Which statement about graphite and diamond is correct?

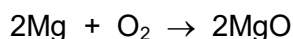
- A Diamond has a high melting point but graphite does **not**.
- B Graphite and diamond both conduct electricity.
- C Graphite and diamond both have giant structures.
- D Graphite is ionic and diamond is covalent.

- 8 Carbon dioxide gas reacts with aqueous calcium hydroxide to form calcium carbonate.

Which equation represents this reaction?

- A**  $\text{CO}_2(\text{g}) + \text{Ca}(\text{OH})_2(\text{aq}) \rightarrow \text{CaCO}_3(\text{s}) + \text{H}_2\text{O}(\text{l})$   
**B**  $\text{CO}_2(\text{g}) + \text{Ca}(\text{OH})_2(\text{aq}) \rightarrow \text{CaCO}_3(\text{aq}) + \text{H}_2\text{O}(\text{l})$   
**C**  $2\text{CO}_2(\text{g}) + 2\text{CaOH}(\text{aq}) \rightarrow 2\text{CaCO}_3(\text{s}) + \text{H}_2(\text{g})$   
**D**  $2\text{CO}_2(\text{g}) + 2\text{CaOH}(\text{aq}) \rightarrow 2\text{CaCO}_3(\text{aq}) + \text{H}_2(\text{g})$

- 9 The equation for the combustion of magnesium is shown.



Which mass of magnesium oxide will be formed from the complete reaction of 9.6 g of magnesium?

- A** 8.0 g                      **B** 16.0 g                      **C** 24.0 g                      **D** 40.0 g

- 10 Which row identifies the product at each electrode when molten zinc chloride is electrolysed using inert electrodes?

|          | positive electrode | negative electrode |
|----------|--------------------|--------------------|
| <b>A</b> | $\text{O}_2$       | Zn                 |
| <b>B</b> | $\text{Cl}_2$      | Zn                 |
| <b>C</b> | Zn                 | $\text{Cl}_2$      |
| <b>D</b> | Zn                 | $\text{O}_2$       |

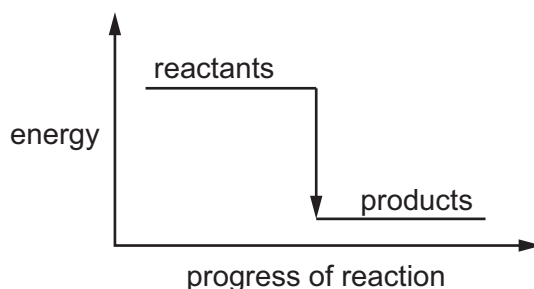
- 11 Which equation represents the reaction in a hydrogen–oxygen fuel cell?

- A**  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$   
**B**  $2\text{H}_2 + 2\text{O} \rightarrow 2\text{H}_2\text{O}$   
**C**  $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$   
**D**  $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + 2\text{O}$

- 12 What is always produced when a fuel is burned?

- A** carbon dioxide  
**B** carbon monoxide  
**C** oxides of nitrogen  
**D** thermal energy

- 13 The reaction pathway diagram shows the energy of the reactants and products in a chemical reaction.



Which row describes the enthalpy change and the type of reaction shown?

|          | description of energy change                     | type of reaction |
|----------|--------------------------------------------------|------------------|
| <b>A</b> | thermal energy is given out to the surroundings  | endothermic      |
| <b>B</b> | thermal energy is given out to the surroundings  | exothermic       |
| <b>C</b> | thermal energy is taken in from the surroundings | endothermic      |
| <b>D</b> | thermal energy is taken in from the surroundings | exothermic       |

- 14 Magnesium is reacted with dilute hydrochloric acid of the same concentration in four experiments using different conditions.

Which reaction finished in the shortest time?

- A** 2 g of magnesium powder in 50 cm<sup>3</sup> of dilute HCl at 45 °C  
**B** 2 g of magnesium powder in 50 cm<sup>3</sup> of dilute HCl at 50 °C  
**C** 2 g of magnesium ribbon in 50 cm<sup>3</sup> of dilute HCl at 45 °C  
**D** 2 g of magnesium ribbon in 50 cm<sup>3</sup> of dilute HCl at 50 °C
- 15 Blue hydrated copper(II) sulfate produces a white solid when it is heated.

The white solid turns blue when water is added.

Which word describes the reaction of hydrated copper(II) sulfate?

- A** neutralisation  
**B** oxidation  
**C** reduction  
**D** reversible

**16** Iron(III) chloride,  $\text{FeCl}_3$ , is a brown solid.

What is the meaning of (III) in the name?

- A** It is the amount of energy released when the compound was formed.
- B** It is the rate of the reaction that formed this compound.
- C** It is how many atoms of iron are bonded together in the compound.
- D** It is the oxidation number of iron in the compound.

**17** What are the units of concentration?

- A**  $\text{mol/dm}^3$       **B**  $\text{g/dm}$       **C**  $\text{dm}^3/\text{mol}$       **D**  $\text{cm/g}$

**18** Which pair of reactants are both soluble in water and mix to form a precipitate?

- A**  $\text{NaCl}$  and  $\text{Mg}(\text{NO}_3)_2$
- B**  $\text{BaSO}_4$  and  $\text{K}_2\text{CO}_3$
- C**  $\text{CaCl}_2$  and  $\text{NaNO}_3$
- D**  $\text{Pb}(\text{NO}_3)_2$  and  $\text{KCl}$

**19** Four oxides are listed.

- 1 lithium oxide
- 2 phosphorus oxide
- 3 sodium oxide
- 4 sulfur dioxide

Which oxides are basic?

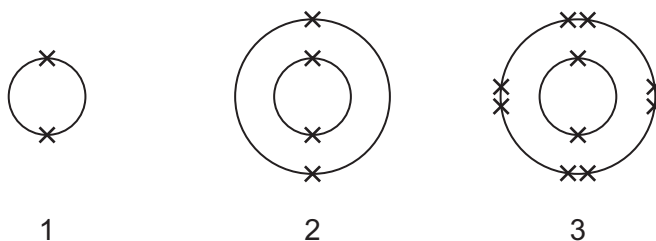
- A** 1 and 2      **B** 1 and 3      **C** 2 and 4      **D** 3 and 4

**20** Cobalt is a typical transition element.

Which statement about cobalt is correct?

- A** Cobalt has a low density.
- B** Cobalt has a low melting point.
- C** Cobalt can form only colourless compounds.
- D** Cobalt can act as a catalyst.

21 Which diagrams show the electronic configuration for an atom of a noble gas?



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

22 Which statement describes the alloy brass?

- A** It is a mixture of iron and nickel.  
**B** It is a mixture of iron compounds.  
**C** It is a compound of copper, zinc and non-metals.  
**D** It is a mixture of the metals copper and zinc.

23 The results of the reaction of metals W, X, Y and Z with cold water and dilute acid are shown.

| metal | reaction with cold water | reaction with dilute acid  |
|-------|--------------------------|----------------------------|
| W     | fizzes, gas evolved      | rapid fizzing, gas evolved |
| X     | no observable reaction   | no observable reaction     |
| Y     | no observable reaction   | slow fizzing, gas evolved  |
| Z     | a few bubbles of gas     | fizzes, gas evolved        |

What is the order of reactivity of the metals?

|          | least<br>reactive | → |   |   | most<br>reactive |
|----------|-------------------|---|---|---|------------------|
| <b>A</b> | W                 | Z | Y | X |                  |
| <b>B</b> | W                 | Y | Z | X |                  |
| <b>C</b> | X                 | Y | Z | W |                  |
| <b>D</b> | X                 | Z | Y | W |                  |

**24** Some methods of preventing iron from rusting are listed.

- 1 alloying with chromium
- 2 greasing
- 3 painting

Which methods are barrier methods?

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

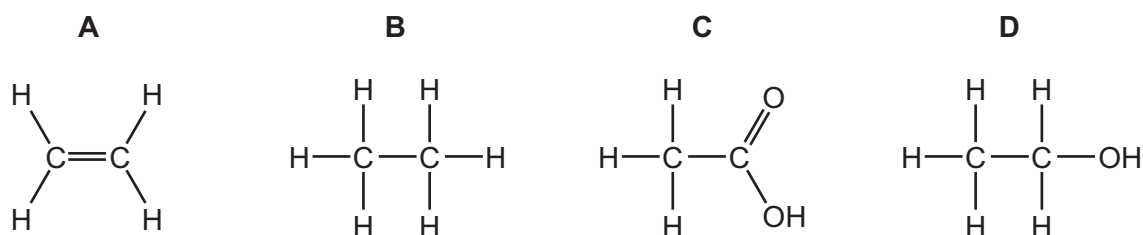
**25** Which metal is extracted from bauxite by electrolysis?

- A** aluminium  
**B** copper  
**C** iron  
**D** zinc

**26** Which statement about water is correct?

- A** When water is added to solid anhydrous cobalt(II) chloride, the solid turns blue.  
**B** Water containing dissolved sodium chloride boils at a temperature greater than 100 °C.  
**C** All dissolved metal ions found in natural sources of water are beneficial to life.  
**D** Soluble impurities are removed during the sedimentation stage in the treatment of drinking water.

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



**28** Which statement about alkanes is correct?

- A** They contain carbon, hydrogen and oxygen only.  
**B** They are saturated compounds with only single ionic bonds.  
**C** The alkanes with longer chain lengths are more volatile.  
**D** They react with chlorine in a substitution reaction.

29 Which row identifies an adverse effect of the named pollutant?

|          | air pollutant   | adverse effect     |
|----------|-----------------|--------------------|
| <b>A</b> | methane         | global warming     |
| <b>B</b> | sulfur dioxide  | cancer             |
| <b>C</b> | particulates    | acid rain          |
| <b>D</b> | carbon monoxide | photochemical smog |

30 Which group of compounds have the same general formula?

- A**  $\text{CH}_4$ ,  $\text{C}_2\text{H}_6$ ,  $\text{C}_3\text{H}_6$   
**B**  $\text{CH}_4$ ,  $\text{C}_3\text{H}_6$ ,  $\text{C}_4\text{H}_8$   
**C**  $\text{C}_2\text{H}_4$ ,  $\text{C}_3\text{H}_6$ ,  $\text{C}_4\text{H}_8$   
**D**  $\text{C}_2\text{H}_4$ ,  $\text{C}_3\text{H}_8$ ,  $\text{C}_4\text{H}_8$

31 Some fractions obtained from petroleum are listed.

|   | fraction     | use                 | position collected in the fractionating column |
|---|--------------|---------------------|------------------------------------------------|
| 1 | gasoline     | waxes and polishes  | below refinery gas                             |
| 2 | bitumen      | making roads        | above kerosene                                 |
| 3 | kerosene     | jet fuel            | below gasoline                                 |
| 4 | refinery gas | heating and cooking | above gasoline                                 |

Which rows are correct?

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

32 Four different substances or types of substance are listed.

- 1 hydrogen  
 2 alcohols  
 3 alkenes  
 4 carboxylic acids

Which substances are produced by cracking larger alkane molecules?

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

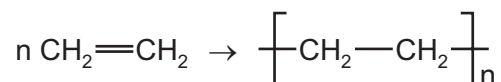
33 Which row shows the conditions used to manufacture ethanol from ethene and steam?

|          | temperature / °C | pressure / kPa |
|----------|------------------|----------------|
| <b>A</b> | 35               | 60             |
| <b>B</b> | 35               | 6000           |
| <b>C</b> | 300              | 60             |
| <b>D</b> | 300              | 6000           |

34 Which statement about aqueous ethanoic acid is correct?

- A** It reacts with metal carbonates to form salts, hydrogen and water.
- B** It reacts with metal oxides to form salts and oxygen.
- C** It reacts with reactive metals to form salts and hydrogen.
- D** It turns damp red litmus paper blue.

35 The equation represents a polymerisation reaction.



Which statements are correct?

- 1 The monomer is ethane.
- 2 The reaction is addition polymerisation.
- 3 The polymer does **not** easily decompose.

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

36 A sample of wax is heated. It begins to melt at 45 °C and finishes melting at 49 °C.

A sample of liquid is heated. It begins to boil at 141 °C and remains at 141 °C while it boils.

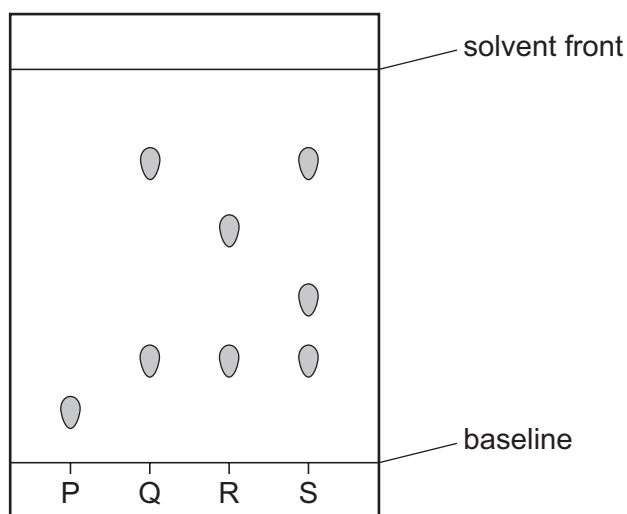
Which conclusion can be made from these results?

- A** Both substances are impure.
- B** Both substances are pure.
- C** The wax is **not** a pure substance and the liquid is a pure substance.
- D** The wax is a pure substance and the liquid is **not** a pure substance.

**37** Four dyes, P, Q, R and S, are analysed using chromatography.

Water is the solvent.

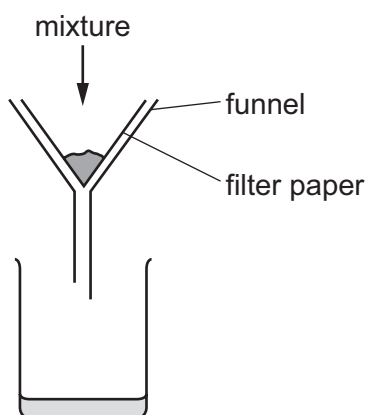
The chromatogram produced is shown.



Which statement about the dyes is correct?

- A** All four dyes are impure.
- B** The four dyes contain a total of eight different substances.
- C** Dye R is a mixture of dye P and dye Q.
- D** Dye S is a mixture of dye Q and one other substance.

**38** The apparatus used to separate a mixture is shown.



What is the mixture?

- A** aqueous calcium chloride and aqueous calcium nitrate
- B** copper(II) hydroxide and aqueous calcium chloride
- C** ethanol and water
- D** sand and calcium carbonate

- 39** Two different white solids are heated and the gases formed are tested.

The gas from solid 1 turns damp red litmus paper blue.

The gas from solid 2 relights a glowing splint.

Which row identifies the gases formed from each solid?

|          | solid 1  | solid 2  |
|----------|----------|----------|
| <b>A</b> | ammonia  | hydrogen |
| <b>B</b> | ammonia  | oxygen   |
| <b>C</b> | chlorine | hydrogen |
| <b>D</b> | chlorine | oxygen   |

- 40** Which aqueous ion gives a blue precipitate when aqueous sodium hydroxide is added?

**A**  $\text{Ca}^{2+}$       **B**  $\text{Cr}^{3+}$       **C**  $\text{Cu}^{2+}$       **D**  $\text{Fe}^{2+}$

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The Periodic Table of Elements

| Group                      |                             |                                                                                             |                                 |                             |                              |                             |                              |                              |                                |                               |                               |                             |                             |                             |                               |                              |                             |                        |
|----------------------------|-----------------------------|---------------------------------------------------------------------------------------------|---------------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|--------------------------------|-------------------------------|-------------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------------|------------------------------|-----------------------------|------------------------|
| I                          | II                          |                                                                                             |                                 |                             |                              |                             |                              |                              |                                |                               |                               | III                         | IV                          | V                           | VI                            | VII                          | VIII                        |                        |
| 3<br>Li<br>lithium<br>7    | 4<br>Be<br>beryllium<br>9   | <div>Key</div> <div>atomic number<br/>atomic symbol<br/>name<br/>relative atomic mass</div> |                                 |                             |                              |                             |                              |                              |                                |                               |                               | 1<br>H<br>hydrogen<br>1     | 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>— | 113<br>Nh<br>nihonium<br>—  | 114<br>Fl<br>flerovium<br>— | 115<br>Mc<br>moscovium<br>— | 116<br>Lv<br>livermorium<br>— | 117<br>Ts<br>tennessine<br>— | 118<br>Og<br>oganesson<br>— |                        |

|             |                              |                            |                                 |                              |                             |                             |                             |                               |                            |                               |                              |                           |                               |                              |                              |
|-------------|------------------------------|----------------------------|---------------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------------|----------------------------|-------------------------------|------------------------------|---------------------------|-------------------------------|------------------------------|------------------------------|
| lanthanoids | 57<br>La<br>lanthanum<br>139 | 58<br>Ce<br>cerium<br>140  | 59<br>Pr<br>praseodymium<br>141 | 60<br>Nd<br>neodymium<br>144 | 61<br>Pm<br>promethium<br>— | 62<br>Sm<br>samarium<br>150 | 63<br>Eu<br>europium<br>152 | 64<br>Gd<br>gadolinium<br>157 | 65<br>Tb<br>terbium<br>159 | 66<br>Dy<br>dysprosium<br>163 | 67<br>Ho<br>holmium<br>165   | 68<br>Er<br>erbium<br>167 | 69<br>Tm<br>thulium<br>169    | 70<br>Yb<br>ytterbium<br>173 | 71<br>Lu<br>lutetium<br>175  |
| actinoids   | 89<br>Ac<br>actinium<br>—    | 90<br>Th<br>thorium<br>232 | 91<br>Pa<br>protactinium<br>231 | 92<br>U<br>uranium<br>238    | 93<br>Np<br>neptunium<br>—  | 94<br>Pu<br>plutonium<br>—  | 95<br>Am<br>americium<br>—  | 96<br>Cm<br>curium<br>—       | 97<br>Bk<br>berkelium<br>— | 98<br>Cf<br>californium<br>—  | 99<br>Es<br>einsteinium<br>— | 100<br>Fm<br>fermium<br>— | 101<br>Md<br>mendelevium<br>— | 102<br>No<br>nobelium<br>—   | 103<br>Lr<br>lawrencium<br>— |

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).