



Cambridge IGCSE™

COMBINED SCIENCE

0653/01

Paper 1 Multiple Choice (Core)

For examination from 2025

SPECIMEN PAPER

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.
- Take the weight of 1.0 kg to be 9.8 N (acceleration of free fall = 9.8 m/s^2).

INFORMATION

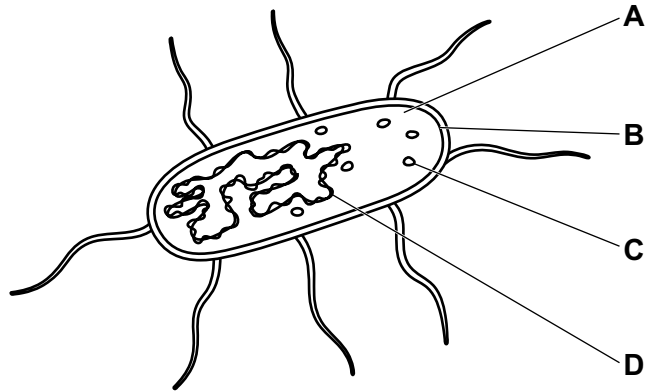
- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

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

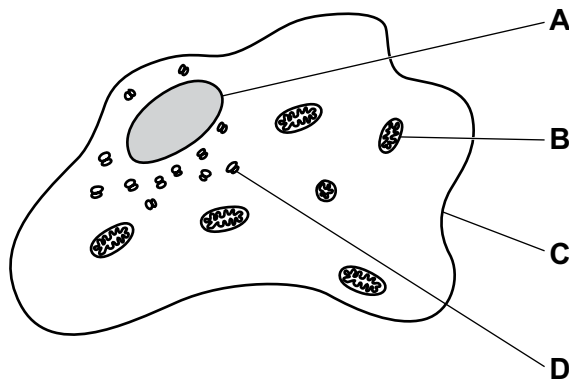
1 Which word describes an action by an organism that causes a change of position or place?

- A excretion
- B growth
- C movement
- D sensitivity

2 Which label represents a plasmid in this diagram of a bacterium?



3 Which label shows the site of aerobic respiration in this diagram of an animal cell?

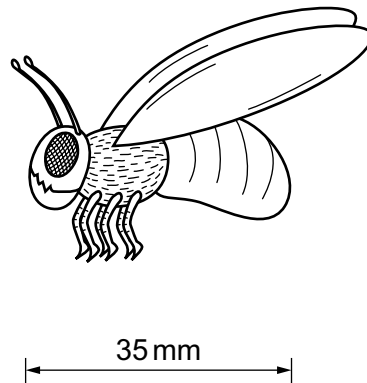


4 What is a type of tissue in a living organism?

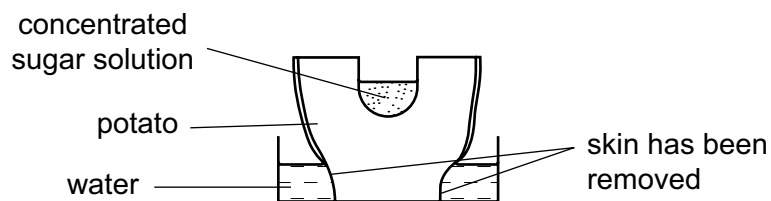
- A blood
- B heart
- C plasma
- D plasmid

- 5 The actual length of a phorid fly is 5.5 mm.

What is the magnification of this diagram of a phorid fly?

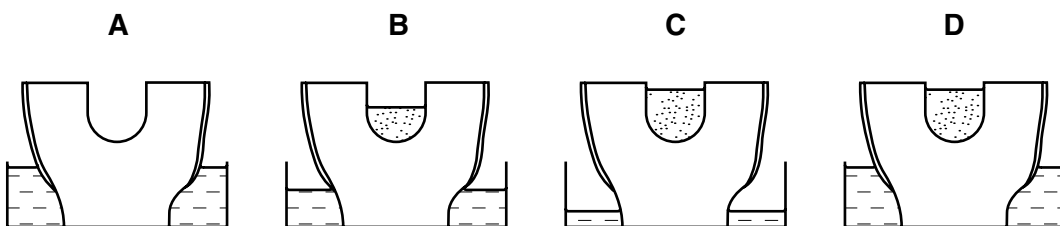


- A 0.16
 B 0.7
 C 6.4
 D 192.5
- 6 The diagram shows an uncooked potato being used in an experiment. The skin of the potato was removed as shown.



The experiment was left for a few hours.

Which diagram shows the result?



- 7 The data shows the concentrations of sugar and starch in an onion.

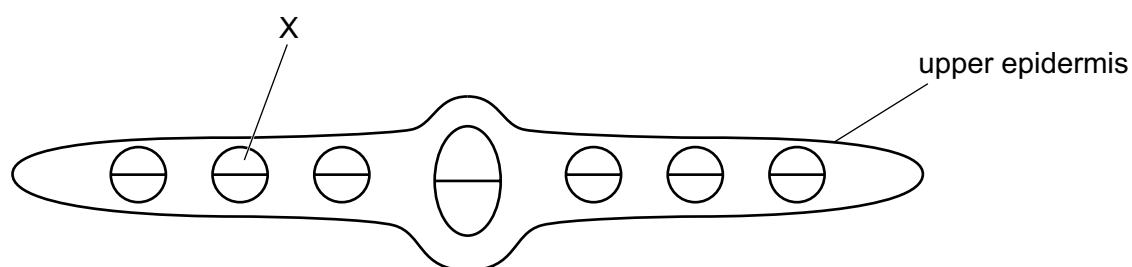
| total sugar including reducing sugar /g per 100 g | starch /g per 100 g |
|---|------------------------|
| 3.7 | 0.0 |

The onion is tested with Benedict's solution and iodine solution.

Which set of results is correct?

| | Benedict's solution | iodine solution |
|----------|---------------------|-----------------|
| A | blue | blue-black |
| B | blue | yellow-brown |
| C | red | blue-black |
| D | red | yellow-brown |

- 8 The diagram shows a cross-section through a leaf.



What are the functions of the tissue labelled X?

- 1 transport of amino acids
- 2 transport of sucrose
- 3 transport of water
- 4 support

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

- 9 What is **not** used to monitor the activity of the heart?

- A** an electrocardiogram (ECG)
- B** diet and exercise
- C** the pulse rate
- D** the sound of the heart valves

10 Which word best describes a disease-causing organism?

- A bacteria
- B pathogen
- C pollutant
- D virus

11 A doctor tells a patient that they are suffering from a viral infection.

Why would the doctor **not** prescribe antibiotics to the patient?

- A antibiotics do not affect viruses
- B antibiotics are drugs
- C long-term use of antibiotics may reduce the effectiveness against the viruses
- D some bacteria are resistant to antibiotics

12 Which row contains the words that can replace **X**, **Y** and **Z** in the description of a food chain?

Energy from the Sun is transferred as ...**X**... to be stored as ...**Y**... energy in a ...**Z**... .

| | X | Y | Z |
|----------|----------|----------|----------|
| A | chemical | light | consumer |
| B | chemical | kinetic | producer |
| C | light | chemical | producer |
| D | light | kinetic | consumer |

13 Biodiversity is the number of different ...**R**... in an area.

Which word replaces **R** in the sentence?

- A food chains
- B food-webs
- C organisms
- D species

- 14 Which row describes how the volume of a gas changes when the temperature is changed but the pressure stays the same?

| | temperature | volume |
|----------|----------------|----------------|
| A | decreases | decreases |
| B | stays the same | increases |
| C | increases | stays the same |
| D | increases | decreases |

- 15 Which statement about ionic compounds is correct?

- A** They are good electrical conductors when dissolved in water.
B They are good electrical conductors when molten and when solid.
C They are formed when atoms share electrons.
D They have low melting points.

- 16 Which equation for the reaction between magnesium and dilute hydrochloric acid is correct?

- A** $\text{Mg(s)} + 2\text{HCl(l)} \rightarrow \text{MgCl}_2\text{(l)} + \text{H}_2\text{(g)}$
B $\text{Mg(s)} + 2\text{HCl(aq)} \rightarrow \text{MgCl}_2\text{(aq)} + \text{H}_2\text{(g)}$
C $2\text{Mg(s)} + 2\text{HCl(l)} \rightarrow 2\text{MgCl}_2\text{(l)} + \text{H}_2\text{(g)}$
D $2\text{Mg(s)} + 2\text{HCl(aq)} \rightarrow 2\text{MgCl}_2\text{(aq)} + \text{H}_2\text{(g)}$

- 17 Which equation shows a reduction of the underlined substance?

- A** $\underline{\text{C}} + \text{O}_2 \rightarrow \text{CO}_2$
B $\text{C} + \underline{\text{CO}_2} \rightarrow 2\text{CO}$
C $\underline{\text{Mg}} + \text{H}_2\text{O} \rightarrow \text{MgO} + \text{H}_2$
D $\text{NaOH} + \underline{\text{HCl}} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

18 The products of a reaction are water, calcium chloride and carbon dioxide only.

Which reaction mixture gives these products?

- A calcium and hydrochloric acid
- B calcium hydroxide and hydrochloric acid
- C calcium carbonate and hydrochloric acid
- D calcium oxide and hydrochloric acid

19 Which row identifies the formulas of an acidic oxide and a basic oxide?

| | acidic oxide | basic oxide |
|---|-------------------|-------------------|
| A | NO ₂ | CaO |
| B | SO ₂ | CO ₂ |
| C | CuO | Na ₂ O |
| D | Li ₂ O | SiO ₂ |

20 Which statement describes the trends shown by the elements down Group I of the Periodic Table?

- A They become less dense and less reactive.
- B They become less dense and more reactive.
- C They become more dense and less reactive.
- D They become more dense and more reactive.

21 Which statements about the transition elements are correct?

- 1 They have low densities.
- 2 They form coloured compounds.
- 3 They often act as catalysts.
- 4 They have low melting points.

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

- 22** Which statement describes helium and neon?
- A** They are diatomic and have high thermal conductivities.
 - B** They are diatomic and have low melting points.
 - C** They are monatomic and have high boiling points.
 - D** They are monatomic and have low electrical conductivities.
- 23** Which statement about the industrial extraction of metals from their ores is correct?
- A** Aluminium is obtained from bauxite.
 - B** Iron is obtained by the electrolysis of iron(III) oxide.
 - C** Iron is obtained by the oxidation of iron(III) oxide.
 - D** The higher a metal is in the reactivity series the easier it is to extract.
- 24** What is used to remove tastes and odours from the domestic water supply during water treatment?
- A** carbon
 - B** chlorine
 - C** filtration
 - D** sedimentation
- 25** Which adverse effects are caused by particulates in the air?
- A** acid rain and global warming
 - B** cancer and respiratory problems
 - C** global warming and cancer
 - D** respiratory problems and acid rain
- 26** Petroleum is separated by fractional distillation.
- Which fraction is used as a fuel in diesel engines?
- A** naphtha
 - B** gasoline
 - C** gas oil
 - D** refinery gas

27 A mixture of salt solution and an insoluble solid is separated by ...**P**...

The insoluble solid that is collected is the ...**Q**...

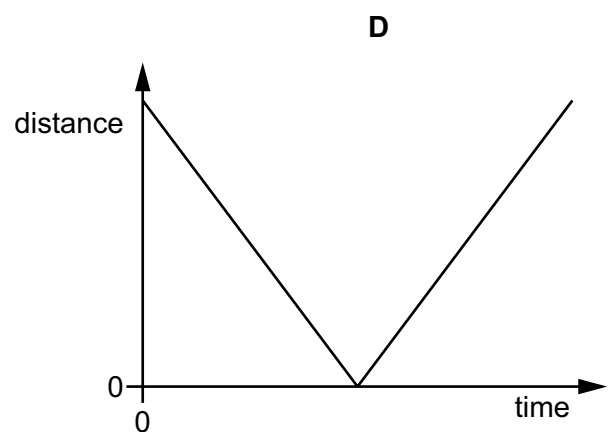
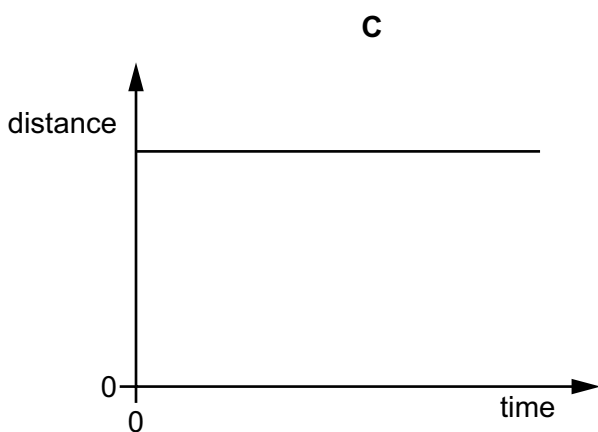
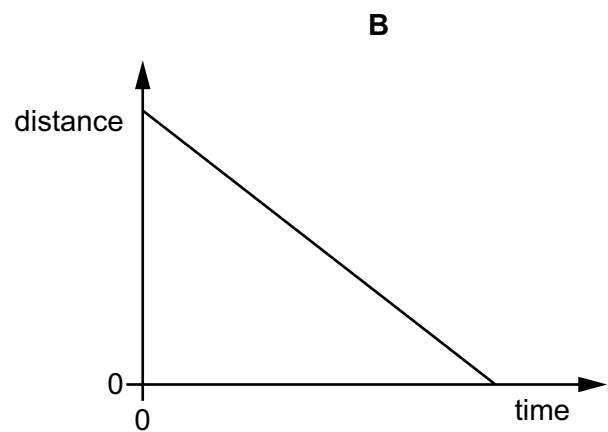
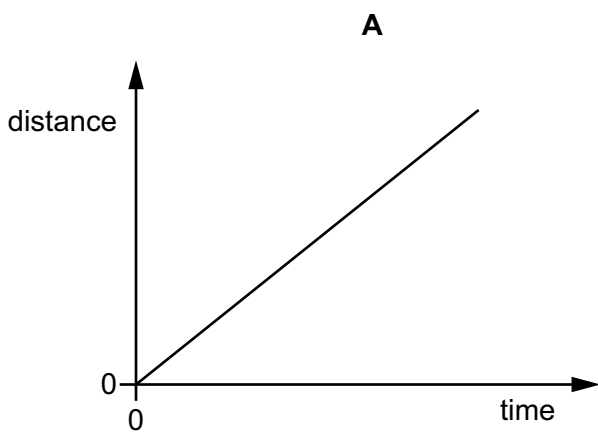
Pure salt crystals are obtained from the separated salt solution by ...**R**... of the water.

Which words complete gaps **P**, **Q** and **R**?

| | P | Q | R |
|----------|-------------|----------|-------------|
| A | evaporation | filtrate | filtration |
| B | evaporation | residue | filtration |
| C | filtration | filtrate | evaporation |
| D | filtration | residue | evaporation |

28 The diagrams show four distance–time graphs.

Which graph represents the motion of an object that is at rest?



29 A solid block has a density of 1.1 g/cm^3 .

The block is lowered into three liquids, **X**, **Y** and **Z**, with different densities.

The densities of the liquids are:

liquid **X**: 1.0 g/cm^3

liquid **Y**: 1.2 g/cm^3

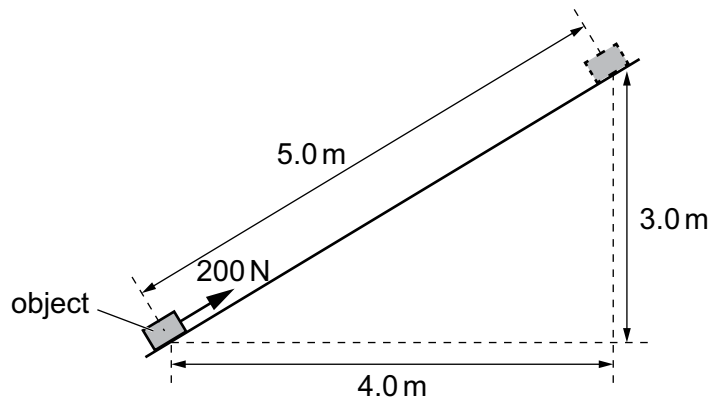
liquid **Z**: 1.3 g/cm^3 .

In which of the liquids does the block float?

- A in liquid **X** only
- B in liquids **Y** and **Z** only
- C in liquids **X**, **Y** and **Z**
- D in none of the liquids

30 The diagram shows a force of 200 N pulling an object up a slope. The object moves 5.0 m along the slope.

The object moves 3.0 m vertically upwards and 4.0 m horizontally, as shown in the diagram.



How much work is done by the 200 N force?

- A 600 J
- B 800 J
- C 1000 J
- D 1400 J

- 31 A sample of a substance has a definite shape and a definite volume.

The substance changes state. The sample now has **no** definite shape but still has a definite volume.

What is the name of the change of state?

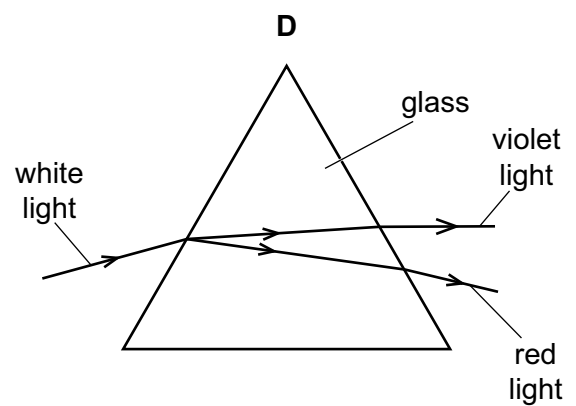
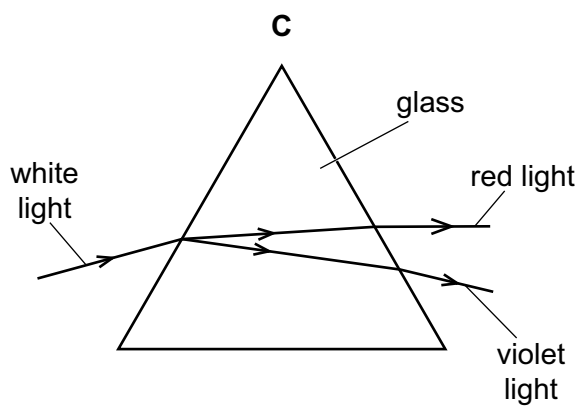
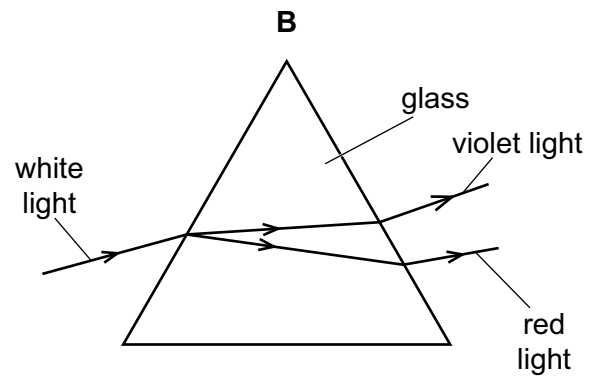
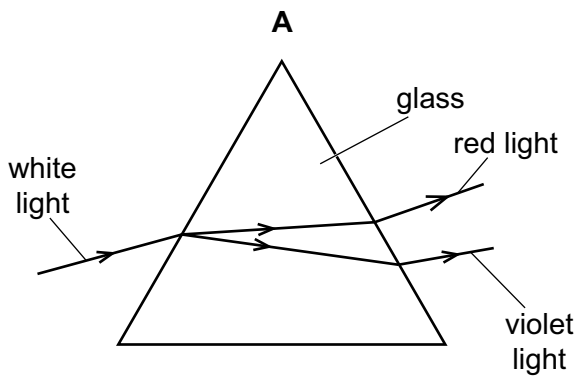
- A condensation
 - B evaporation
 - C freezing
 - D melting
- 32 Which statement about thermal radiation is correct?
- A It can travel through a vacuum.
 - B It is absorbed more quickly by shiny surfaces than by dull surfaces.
 - C It is emitted more quickly by shiny surfaces than by dull surfaces.
 - D It is mainly ultraviolet radiation.
- 33 A wave has a frequency of 6.0 kHz and travels at a speed of 300 m/s.

What is the wavelength of the wave?

- A 0.020 m
- B 0.050 m
- C 20 m
- D 50 m

34 White light passes through a glass prism and produces a spectrum.

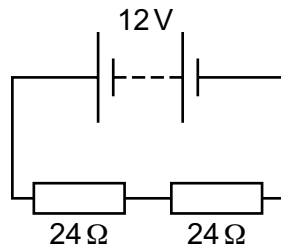
Which diagram shows the paths of the red light and the violet light?



35 What is the frequency range of ultrasound?

- A all frequencies between 20 Hz and 20 kHz
- B all frequencies higher than 20 kHz
- C all frequencies lower than 20 Hz
- D all frequencies lower than 20 Hz and all frequencies higher than 20 kHz

- 36 Two $24\ \Omega$ resistors are connected in series to a 12V battery.



What is the current in **one** of the resistors?

- A 0.25A
 B 0.50A
 C 2.0A
 D 4.0A
- 37 An electric heater and an electric motor are connected to a mains power supply.
 The power of the heater is 3.0kW and the power of the motor is 1.0kW.
 The cost of electricity is \$0.20 per kWh.
 What is the total cost of using the heater and the motor for 5.0 hours?
- A \$0.12
 B \$0.16
 C \$3.00
 D \$4.00
- 38 A teacher wants to connect an electric heater to the mains supply.
 The safety label on the heater states that the heater is double-insulated.
 What does the teacher know from reading this label?
- A The outer casing of the heater does **not** need to be earthed.
 B The outer casing of the heater must be earthed.
 C The heater needs two fuses.
 D The heater needs two trip switches.

- 39** What is a light-year?
- A** the distance travelled by light in a vacuum in 1 year
 - B** the distance travelled by light in a vacuum in 100 000 years
 - C** the time taken for light to travel across the Universe
 - D** the time taken for light to travel across the Milky Way galaxy
- 40** Which sequence is part of the life cycle of a small star (about the same size as the Sun)?
- A** red giant → planetary nebula + white dwarf
 - B** red giant → supernova → black hole
 - C** red supergiant → planetary nebula + black hole
 - D** red supergiant → supernova → white dwarf

The Periodic Table of Elements

| Group | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|------------------------------------|--|--|------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------|--------------------------------------|--------------------------------------|------------------------------------|------------------------------------|------------------------------------|--------------------------------------|-------------------------------------|------------------------------------|------------------------------------|----------------------------------|------------------------------------|--------------------------------|-------------------------------------|--------------------------------|
| I | II | | | | | | | | | | | III | IV | V | VI | VII | VIII | | | | | | |
| 3 Li lithium 7 | 4 Be beryllium 9 | 1 H hydrogen 1 | 2 He helium 4 | | | | | | | | | | | | | | | 5 B boron 11 | 6 C carbon 12 | 7 N nitrogen 14 | 8 O oxygen 16 | 9 F fluorine 19 | 10 Ne neon 20 |
| 11 Na sodium 23 | 12 Mg magnesium 24 | Key atomic number atomic symbol name relative atomic mass | | | | | | | | | | | | | | | | 13 Al aluminium 27 | 14 Si silicon 28 | 15 P phosphorus 31 | 16 S sulfur 32 | 17 Cl chlorine 35.5 | 18 Ar argon 40 |
| 19 K potassium 39 | 20 Ca calcium 40 | 21 Sc scandium 45 | 22 Ti titanium 48 | 23 V vanadium 51 | 24 Cr chromium 52 | 25 Mn manganese 55 | 26 Fe iron 56 | 27 Co cobalt 59 | 28 Ni nickel 59 | 29 Cu copper 64 | 30 Zn zinc 65 | 31 Ga gallium 70 | 32 Ge germanium 73 | 33 As arsenic 75 | 34 Se selenium 79 | 35 Br bromine 80 | 36 Kr krypton 84 | | | | | | |
| 37 Rb rubidium 85 | 38 Sr strontium 88 | 39 Y yttrium 89 | 40 Zr zirconium 91 | 41 Nb niobium 93 | 42 Mo molybdenum 96 | 43 Tc technetium — | 44 Ru ruthenium 101 | 45 Rh rhodium 103 | 46 Pd palladium 106 | 47 Ag silver 108 | 48 Cd cadmium 112 | 49 In indium 115 | 50 Sn tin 119 | 51 Sb antimony 122 | 52 Te tellurium 128 | 53 I iodine 127 | 54 Xe xenon 131 | | | | | | |
| 55 Cs caesium 133 | 56 Ba barium 137 | 57–71 lanthanoids | 72 Hf hafnium 178 | 73 Ta tantalum 181 | 74 W tungsten 184 | 75 Re rhenium 186 | 76 Os osmium 190 | 77 Ir iridium 192 | 78 Pt platinum 195 | 79 Au gold 197 | 80 Hg mercury 201 | 81 Tl thallium 204 | 82 Pb lead 207 | 83 Bi bismuth 209 | 84 Po polonium — | 85 At astatine — | 86 Rn radon — | | | | | | |
| 87 Fr francium — | 88 Ra radium — | 89–103 actinoids | 104 Rf rutherfordium — | 105 Db dubnium — | 106 Sg seaborgium — | 107 Bh bohrium — | 108 Hs hassium — | 109 Mt meitnerium — | 110 Ds darmstadtium — | 111 Rg roentgenium — | 112 Cn copernicium — | 113 Nh nihonium — | 114 Fl flerovium — | 115 Mc moscovium — | 116 Lv livermorium — | 117 Ts tennessine — | 118 Og oganesson — | | | | | | |

lanthanoids

actinoids

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

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

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