



Cambridge IGCSE™

COMBINED SCIENCE

0653/13

Paper 1 Multiple Choice (Core)

October/November 2024

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

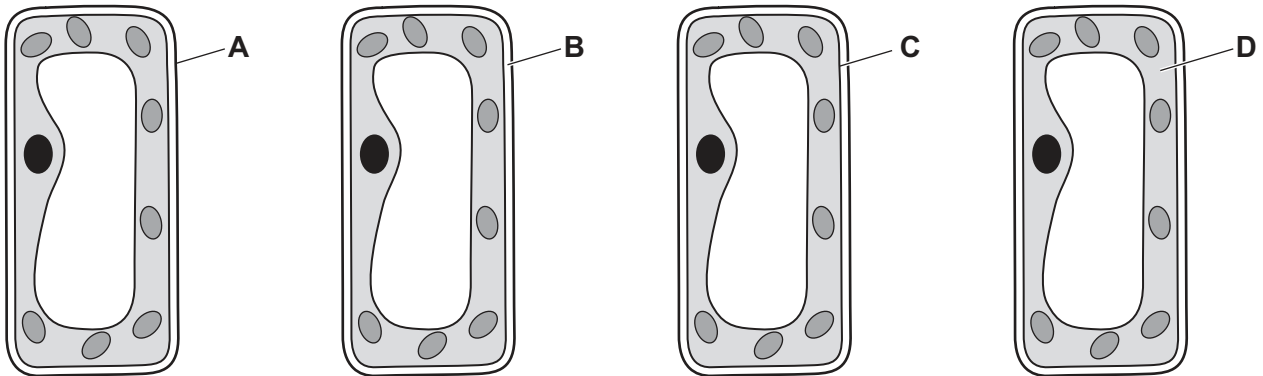
- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the 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

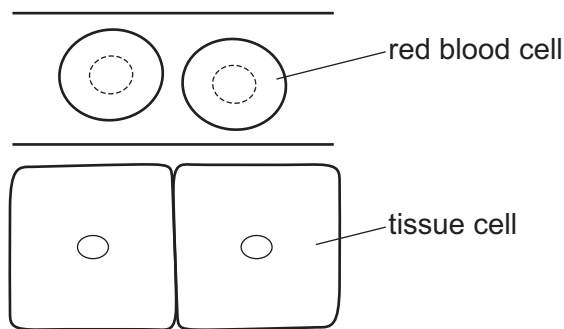
- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages.

1 Which label shows the cell membrane?



2 The diagram shows two red blood cells inside a capillary and two tissue cells near this capillary.



How does the oxygen in the red blood cells reach the tissue cells?

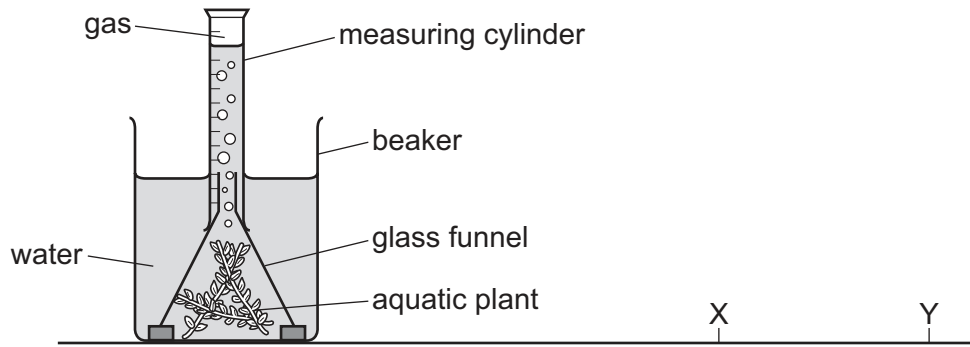
- A by absorption
- B by diffusion
- C by respiration
- D by transpiration

3 When a food sample is heated with Benedict's solution, an orange colour appears.

Which nutrient must be present in the food?

- A fat
- B protein
- C reducing sugar
- D starch

- 4 A student investigates how light affects photosynthesis.



The student shines a light from point Y and measures the volume of gas produced in five minutes.

Which gas is produced, and how does the rate of gas production change when the light is moved from Y to X?

	gas produced	rate of gas production
A	carbon dioxide	decreases
B	carbon dioxide	increases
C	oxygen	decreases
D	oxygen	increases

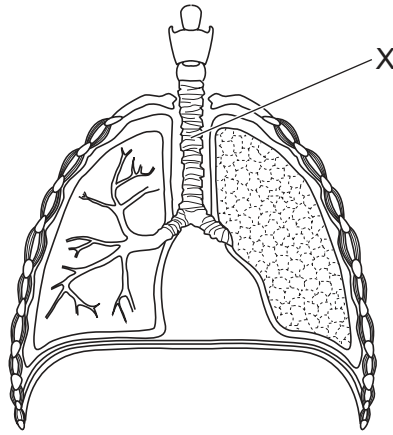
- 5 Which component of the diet ensures that ingested food passes through the alimentary canal quickly and efficiently?

- A** fats
- B** fibre
- C** protein
- D** vitamins

- 6 What is the pathway taken by water through a plant?

- A** root hair cell → root cortex cells → xylem → mesophyll cells
- B** root hair cell → root cortex cells → mesophyll cells → xylem
- C** xylem → root hair cell → root cortex cells → mesophyll cells
- D** xylem → mesophyll cells → root cortex cells → root hair cell

- 7 The diagram shows the human respiratory system.



What is the structure labelled X?

- A** bronchiole
 - B** intercostal muscle
 - C** rib
 - D** trachea
- 8 Which row shows effects of increased adrenaline secretion on the body?

	breathing rate	size of pupils
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

- 9 When a seed is germinated in the dark, the shoot grows upwards.

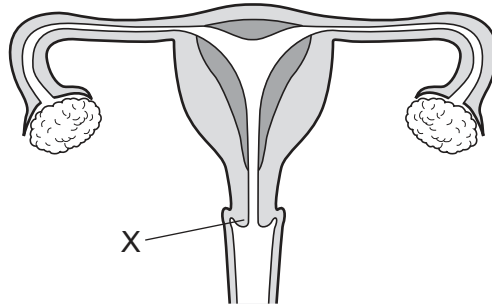
What is this growth response?

- A** away from gravity
- B** away from light
- C** towards gravity
- D** towards light

10 Which statement is correct?

- A Asexual reproduction results in the formation of a zygote.
- B Asexual reproduction results in genetically identical offspring from one parent.
- C Sexual reproduction only occurs in animals.
- D Sexual reproduction results in genetically identical offspring from two parents.

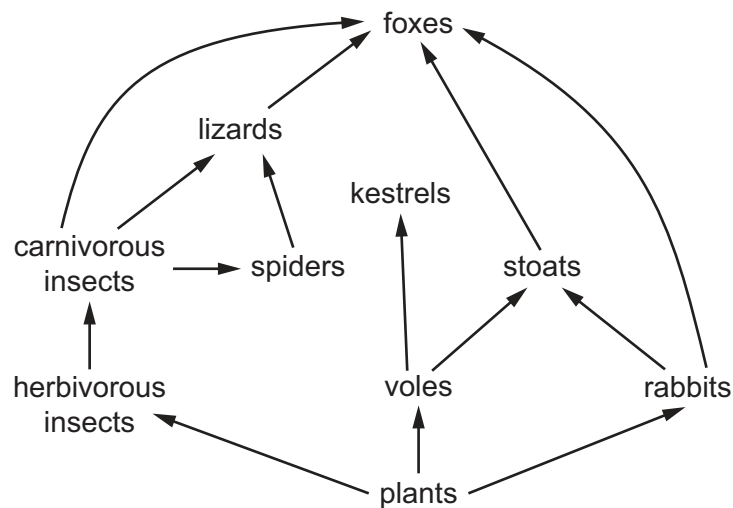
11 The diagram shows the female human reproductive system.



What is the name of the structure labelled X?

- A cervix
- B ovary
- C uterus
- D vagina

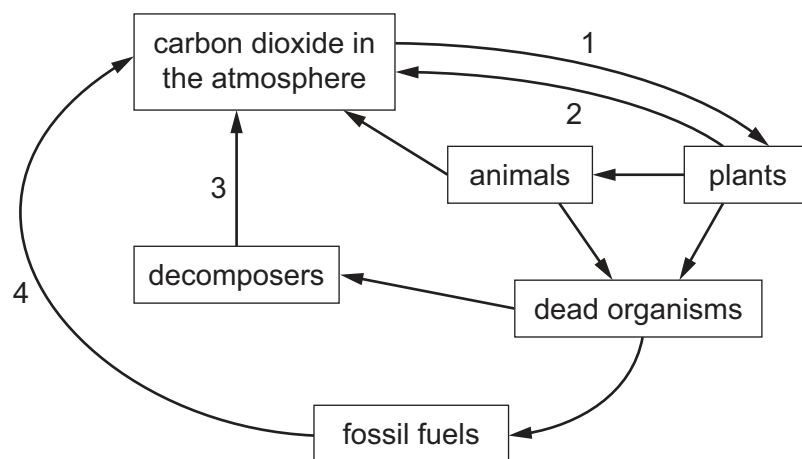
12 The diagram shows a food web.



Which organisms in this food web are secondary consumers?

- A carnivorous insects and voles
- B foxes and lizards
- C kestrels and stoats
- D spiders and stoats

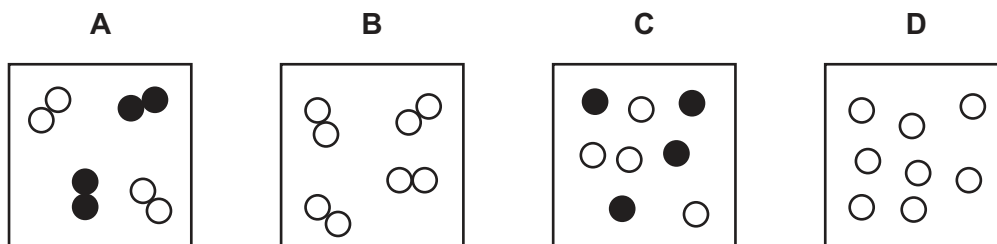
13 The diagram shows part of the carbon cycle.



Which processes are represented by 1, 2, 3 and 4?

	1	2	3	4
A	photosynthesis	respiration	respiration	combustion
B	photosynthesis	combustion	respiration	respiration
C	respiration	photosynthesis	respiration	combustion
D	respiration	combustion	photosynthesis	respiration

14 Which diagram represents a mixture of different molecules?



15 Some changes are listed.

- 1 boiling
- 2 decomposing
- 3 evaporating
- 4 oxidising

Which changes are physical changes?

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

16 Water has the chemical formula H_2O .

Which statement is correct?

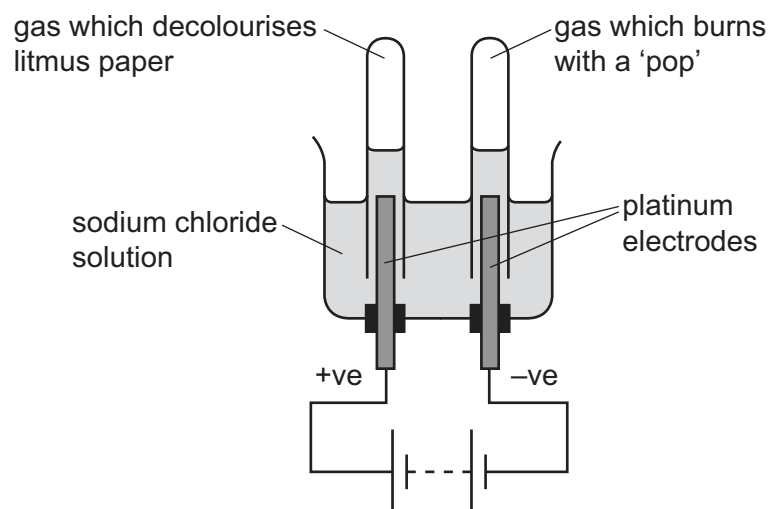
- A** Pure water is a mixture because it contains hydrogen and oxygen.
B Pure water is an element because it contains only one type of molecule.
C Salt water is a compound because it contains salt and water.
D Salt water is a mixture because it contains salt and water.

17 Which two elements combine to form an ionic compound?

- A** carbon and oxygen
B copper and zinc
C hydrogen and oxygen
D magnesium and chlorine

- 18** Concentrated aqueous sodium chloride is electrolysed and a gas is collected at each electrode.

One gas decolourises moist litmus paper, the other gas burns with a 'pop'.



Which statement is correct?

- A** Chlorine gas is collected at the anode.
 - B** Hydrogen gas is collected at the anode.
 - C** Oxygen gas is collected at the cathode.
 - D** Sodium is formed at the cathode.
- 19** Which type of reaction occurs when iron is obtained from its oxide using carbon?
- A** combustion
 - B** neutralisation
 - C** electrolysis
 - D** reduction

- 20 The steps needed to make pure, dry magnesium sulfate crystals from magnesium oxide and dilute sulfuric acid are listed.

- 1 filter
- 2 leave to cool
- 3 add excess magnesium oxide to sulfuric acid and heat
- 4 dry
- 5 filter and wash
- 6 heat to evaporate some of the water

In which order are these steps carried out?

- A** 3 → 1 → 2 → 5 → 6 → 4
B 3 → 1 → 6 → 2 → 5 → 4
C 3 → 2 → 1 → 6 → 4 → 5
D 3 → 5 → 2 → 6 → 1 → 4

- 21 Which row describes trends shown by the elements in Group I and Group VII of the Periodic Table as the groups are descended?

	Group I	Group VII
A	melting point increases	colour becomes darker
B	melting point decreases	colour becomes darker
C	they become more reactive	colour becomes lighter
D	they become less reactive	colour becomes lighter

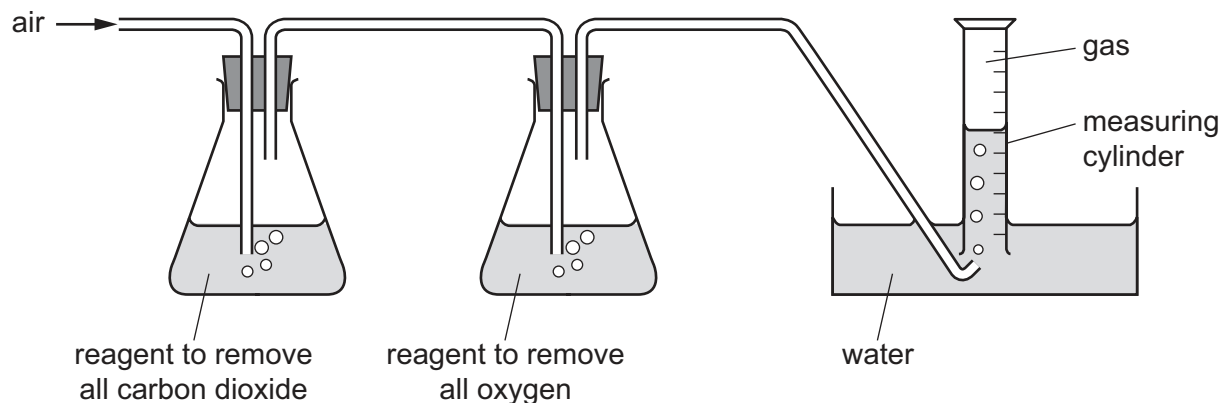
- 22 What is the electronic structure of a noble gas?

- A** 2 **B** 2,1 **C** 2,8,2 **D** 2,8,7

- 23 Which row explains why carbon is used to extract copper from copper oxide and identifies the type of reaction that occurs during the extraction?

	explanation	type of reaction
A	carbon is more reactive than copper	redox
B	carbon is more reactive than copper	thermal decomposition
C	carbon is less reactive than copper	redox
D	carbon is less reactive than copper	thermal decomposition

24 A 100 cm³ sample of clean air is passed into the apparatus as shown.



What is the volume and the composition of the gas collected in the measuring cylinder?

	volume / cm ³	composition
A	21	pure nitrogen
B	21	nitrogen and other gases
C	79	nitrogen and other gases
D	79	pure nitrogen

25 Which substance is a greenhouse gas?

- A** carbon monoxide
- B** chlorine
- C** methane
- D** nitrogen

26 Which statement explains why alkanes are saturated compounds?

- A** They are not very reactive.
- B** They contain double covalent bonds.
- C** They contain carbon and hydrogen only.
- D** They contain only single covalent bonds.

27 Which statement about alkenes is correct?

- A They are manufactured in addition polymerisation reactions.
- B They react with aqueous bromine to give colourless products.
- C They are compounds containing carbon, hydrogen and oxygen.
- D They are cracked to produce other compounds.

28 Which expression is the definition of speed?

- A $\frac{\text{change in acceleration}}{\text{time taken}}$
- B $\frac{\text{distance travelled}}{\text{time taken}}$
- C $\frac{\text{time taken}}{\text{change in acceleration}}$
- D $\frac{\text{time taken}}{\text{distance travelled}}$

29 A solid, rectangular block of wood has length 4.0 cm, width 5.0 cm and height 6.0 cm.

The mass of the block is 90 g.

What is the density of the wood?

- A 0.75 g/cm³ B 1.3 g/cm³ C 4.5 g/cm³ D 6.0 g/cm³

30 Which change **cannot** be caused by a force acting on an object?

- A change of mass
- B change of motion
- C change of shape
- D change of size

- 31 Student R has a mass of 80 kg. Student S has a mass of 50 kg.

On day 1, the students walk up the stairs to the top of a building in 15 minutes.

On day 2, the students climb a vertical wall to the top of the same building in 2.0 hours.

Which student uses the greatest power in reaching the top of the building, and when?

- A student R on day 1
- B student S on day 1
- C student R on day 2
- D student S on day 2

- 32 In which situation is **no** energy transfer occurring?

- A a ball falling from rest through the air to the ground
- B a battery lighting a lamp
- C a metal block hanging at rest from a stretched spring
- D a saucepan being heated

- 33 Benzene and glycerine are two substances.

The table gives the melting point and the boiling point of benzene and of glycerine.

	melting point/°C	boiling point/°C
benzene	5.4	80
glycerine	18	290

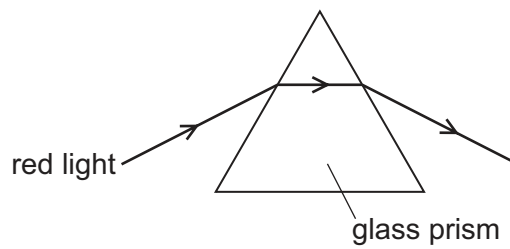
At which temperature are both benzene and glycerine liquid?

- A 0 °C
- B 50 °C
- C 90 °C
- D 300 °C

- 34 Which substances expand when heated?

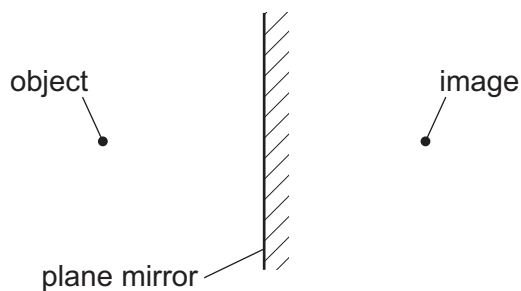
- A gases only
- B liquids only
- C solids only
- D solids, liquids and gases

- 35 A ray of red light enters a triangular glass prism. The ray passes through the prism and emerges travelling in a different direction.



Which effect causes the changes of direction?

- A absorption
 - B convection
 - C reflection
 - D refraction
- 36 An object is placed in front of a plane mirror. An image of the object is formed in the position shown.

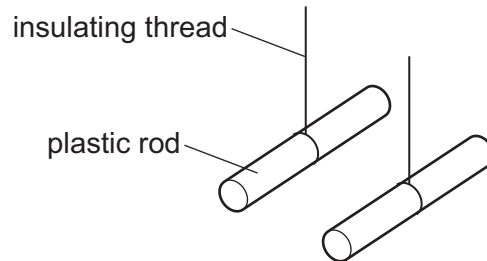


The object is now moved 1.0 cm to the left.

What happens to the image?

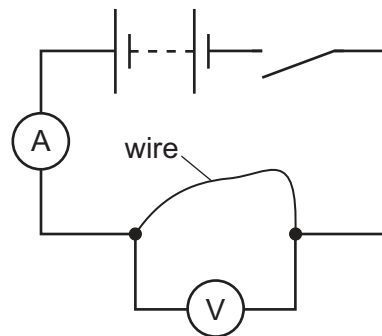
- A It moves 1.0 cm to the left.
- B It moves 1.0 cm to the right.
- C It moves 2.0 cm to the left.
- D It moves 2.0 cm to the right.

- 37** An uncharged plastic rod is rubbed with a cloth and suspended by an insulating thread. The process is repeated using a second identical rod and a second identical cloth. The rods are then placed close to each other.



What happens, and why?

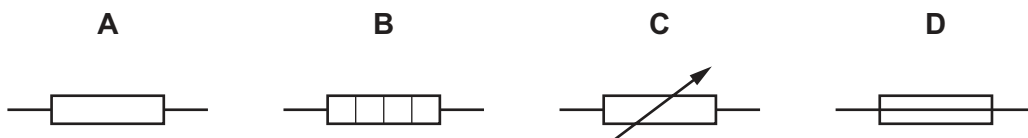
- A** The rods attract each other because they have like charges.
 - B** The rods attract each other because they have unlike charges.
 - C** The rods repel each other because they have like charges.
 - D** The rods repel each other because they have unlike charges.
- 38** A student sets up a circuit to find the resistance of a length of wire.



When the switch is closed, the ammeter reads 2.0 A and the voltmeter reads 10 V .

What is the resistance of the length of wire?

- A** $0.20\ \Omega$
 - B** $5.0\ \Omega$
 - C** $8.0\ \Omega$
 - D** $20\ \Omega$
- 39** What is the circuit symbol for a fuse?



40 A person uses an electric lawnmower to cut the grass in a garden.



Which situations are electrical hazards?

- 1 using the lawnmower when the insulation on the cable is damaged
- 2 plugging the lawnmower into an electric socket in a garage
- 3 using the lawnmower when it is raining

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

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The Periodic Table of Elements

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

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium —	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
	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.).