



Cambridge IGCSE™

COMBINED SCIENCE

0653/13

Paper 1 Multiple Choice (Core)

May/June 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.
- 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.

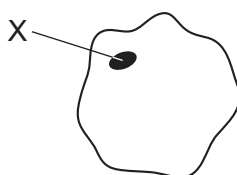


2

1 Which row shows substances that are removed by the process of excretion?

	substances in excess of requirements	waste products	undigested food
A	x	✓	✓
B	✓	x	✓
C	✓	✓	x
D	✓	✓	✓

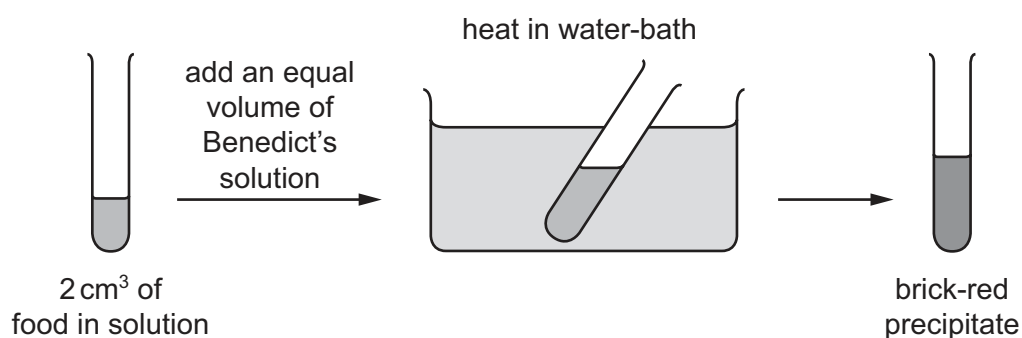
2 The diagram shows an animal cell.



What is the function of part X?

- A** to carry out photosynthesis
- B** to let molecules in and out of the cell
- C** to store and pass on genetic information
- D** to support and protect the cell

3 The diagram shows a food test on some food in solution.

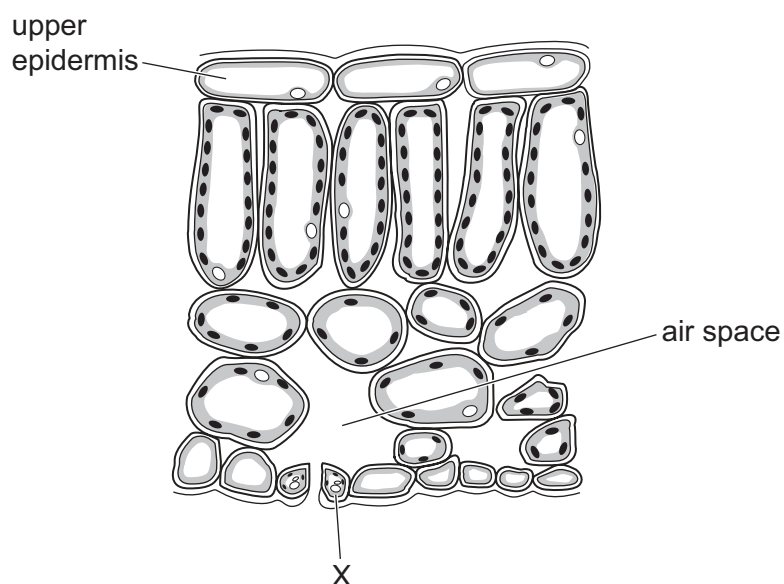


Which biological molecule does the food test show that the food in solution contains?

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

3

- 4** What function as biological catalysts?
- A** antibodies
 - B** enzymes
 - C** hormones
 - D** platelets
- 5** Which substance is required for photosynthesis to occur?
- A** chlorophyll
 - B** glucose
 - C** haemoglobin
 - D** oxygen
- 6** The diagram shows a section through a leaf.



What is the structure labelled X?

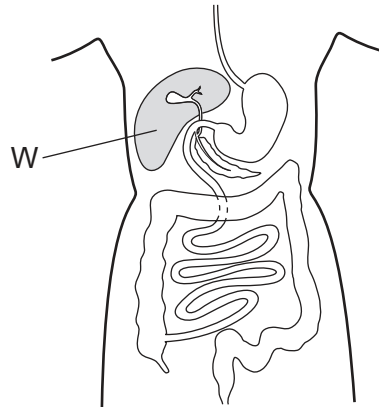
- A** guard cell
- B** palisade mesophyll
- C** phloem
- D** xylem

4

7 What is meant by a balanced diet in humans?

- A** a diet that contains a lot of fibre to aid food passing through the alimentary canal
- B** a diet that has only enough of each food group for the body to maintain good health
- C** every meal contains all the main food groups
- D** each food group is present in excessive amounts

8 The diagram shows part of the human alimentary canal and associated organs.



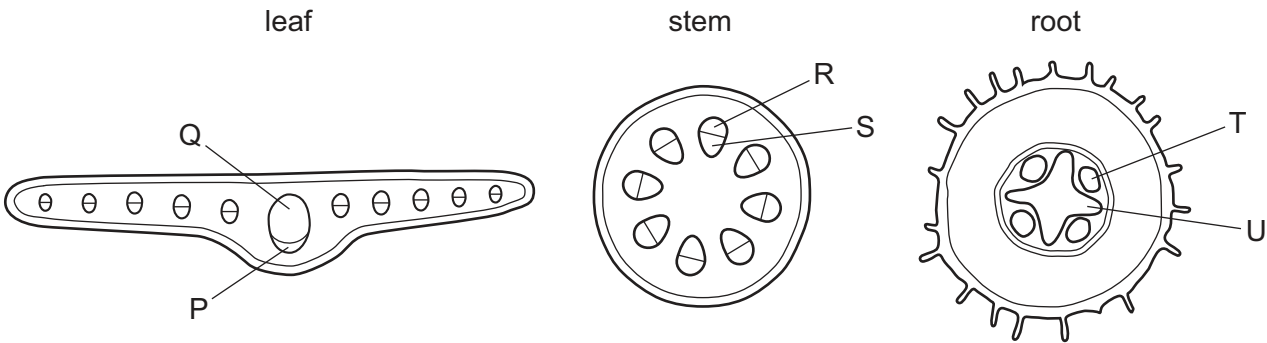
What is the organ labelled W?

- A** gall bladder
- B** liver
- C** oesophagus
- D** stomach

9 Which row shows what happens to soluble food molecules after food is chemically digested?

	name of process	what happens to soluble food molecules
A	ingestion	pass through the blood into the wall of the intestine
B	ingestion	pass through the wall of the intestine into the blood
C	absorption	pass through the blood into the wall of the intestine
D	absorption	pass through the wall of the intestine into the blood

10 The diagrams show sections through different parts of a dicotyledonous plant.



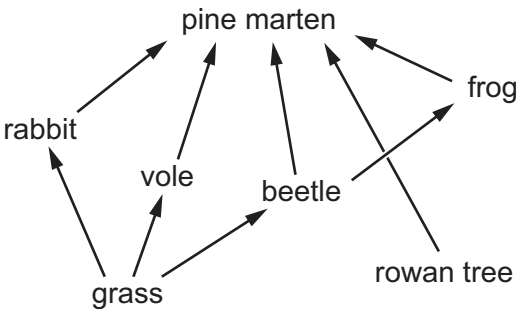
Which tissues transport water through the plant?

- A** P, R and T **B** P, S and U **C** Q, R and T **D** Q, S and U

11 Which part of the female reproductive system matches its function?

	part of the female reproductive system	function
A	cervix	ring of muscle at the opening of the uterus
B	ovaries	the site of fertilisation
C	oviducts	where sperm is deposited
D	uterus	release of female gametes

12 The diagram shows a food web.

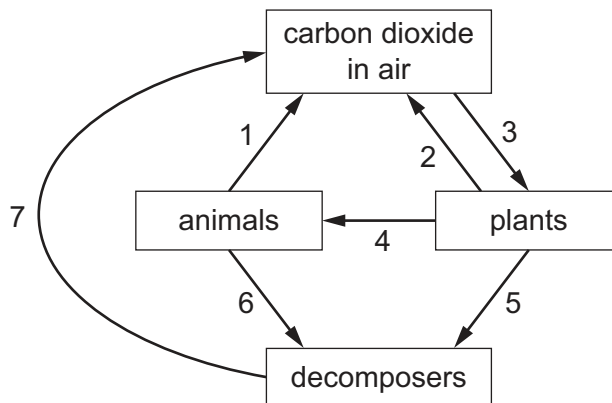


Which row is correct for this food web?

	herbivore	carnivore	producer
A	frog	beetle	grass
B	frog	pine marten	rowan tree
C	beetle	vole	rowan tree
D	vole	frog	grass

6

13 The diagram represents part of the carbon cycle.



Which arrows represent respiration?

- A** 1, 2 and 4 **B** 1, 2 and 7 **C** 3, 5 and 6 **D** 3, 6 and 7

14 Which electronic configuration represents a noble gas?

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

15 What happens when a sodium atom reacts with a chlorine atom?

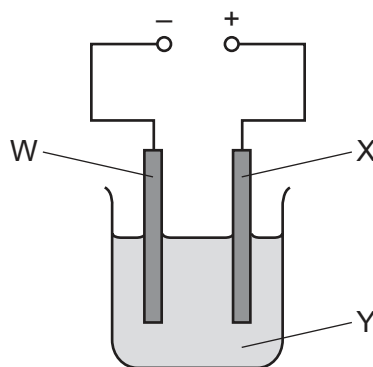
- A** The sodium atom and chlorine atom lose electrons.
B The sodium atom gains an electron and the chlorine atom loses an electron.
C The sodium atom loses an electron and the chlorine atom gains an electron.
D The sodium atom shares electrons with the chlorine atom.

16 What is produced when calcium reacts with dilute hydrochloric acid?

- A** calcium chloride + hydrogen
B calcium chloride + water
C calcium hydroxide + chlorine
D calcium hydroxide + hydrogen

7

17 The diagram shows the apparatus for electrolysis.



Which row identifies W, X and Y?

	W	X	Y
A	anode	cathode	electrolyte
B	anode	cathode	power supply
C	cathode	anode	electrolyte
D	cathode	anode	power supply

18 Magnesium ribbon is added to dilute hydrochloric acid at 20 °C.

The mixture starts to fizz and the temperature increases to 32 °C.

The fizzing then stops and the temperature slowly decreases until it reaches 20 °C. The temperature then remains constant.

Which statement is correct?

- A** The reaction is endothermic.
- B** The reaction is exothermic.
- C** There is an endothermic reaction followed by an exothermic reaction.
- D** There is an exothermic reaction followed by an endothermic reaction.

19 Which process results in a chemical change?

- A** Heat liquid water to form steam.
- B** Mix powdered carbon and iron filings.
- C** Melt iron filings.
- D** Heat sulfur in air to make sulfur dioxide.

20 Which substance contains a covalent bond between two different elements?

- A** chlorine
- B** potassium chloride
- C** hydrogen
- D** hydrogen chloride

21 Universal indicator is placed into a colourless liquid. The colour change of the universal indicator shows that the pH of the liquid is 6.

Which statement about the colourless liquid is correct?

- A** It is an acid that turns the universal indicator red.
- B** It is an acid that turns the universal indicator yellow.
- C** It is an alkali that turns the universal indicator blue.
- D** It is a neutral liquid that turns the universal indicator green.

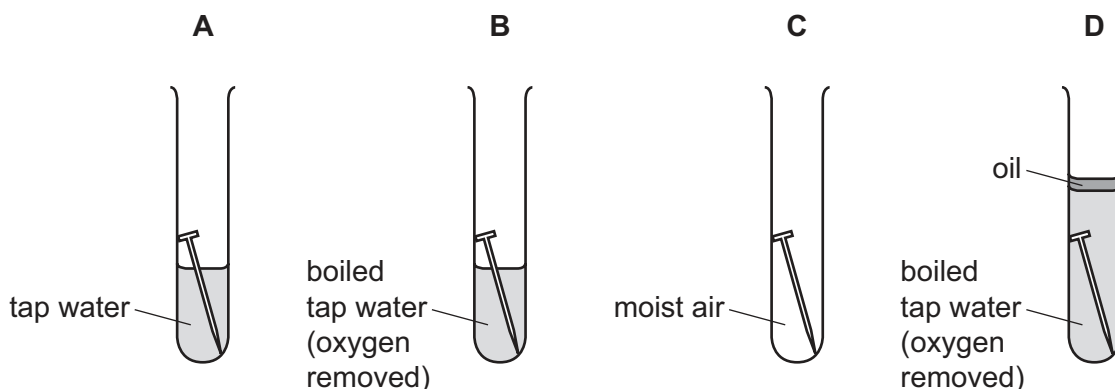
22 Sodium nitrate, NaNO_3 , is a soluble salt.

Which method is used to make pure solid sodium nitrate?

- A** Add aqueous sodium hydroxide to a conical flask, titrate with dilute nitric acid, then crystallise.
- B** Dissolve solid sodium chloride in dilute nitric acid, leave for 10 minutes and then crystallise.
- C** Heat sodium with nitrogen and oxygen. Let the mixture cool, then collect the solid that is made.
- D** Mix copper nitrate and sodium chloride solutions, then filter the mixture and collect the sodium nitrate from the filter paper.

23 Iron nails are placed in four test-tubes under different conditions and left for two weeks.

In which test-tube does the iron nail show the least amount of rust?



24 Brass is an alloy.

Which statement describes brass?

- A** Brass is made of pure copper.
- B** Brass is a mixture of copper and zinc.
- C** Brass is a mixture of lead and tin.
- D** Brass is made of pure zinc.

25 In the blast furnace, iron(III) oxide reacts with carbon monoxide to form iron.

What happens to the iron(III) oxide?

- A** It is oxidised by gaining oxygen.
- B** It is oxidised by losing oxygen.
- C** It is reduced by gaining oxygen.
- D** It is reduced by losing oxygen.

26 A sample of solid sodium chloride is mixed with water and stirred. The sodium chloride dissolves.

Which name describes the solid sodium chloride?

- A** solution
- B** solvent
- C** solute
- D** insoluble salt

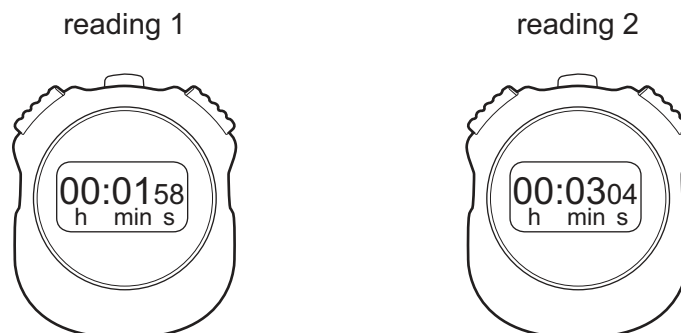
27 Separate samples of the gases ammonia, chlorine, hydrogen and oxygen are tested with damp blue litmus paper.

How many of these gases change the colour of the litmus paper?

- A** 0
- B** 1
- C** 2
- D** 3

- 28 A stop-watch is used to record the time at two points in a race.

The diagram shows the readings.

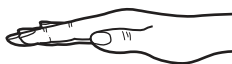


What is the difference in time between reading 1 and reading 2?

- A** 66 s **B** 104 s **C** 146 s **D** 302 s
- 29 Which expression is the definition of density?
- A** $\frac{\text{mass}}{\text{volume}}$ **B** $\frac{\text{volume}}{\text{mass}}$ **C** $\frac{\text{volume}}{\text{weight}}$ **D** $\frac{\text{weight}}{\text{volume}}$
- 30 A car is powered by a petrol engine.
- The car accelerates from rest along a horizontal road.
- Which energy transfer occurs?
- A** electrostatic → kinetic
B electrostatic → gravitational potential
C chemical → kinetic
D chemical → gravitational potential
- 31 Two cylinders contain the same type of gas.
- The gas in one cylinder is at a higher temperature than the gas in the other cylinder.
- Which statement **must** be correct?
- A** In one cylinder, there are more gas particles.
B In one cylinder, the gas occupies a smaller volume.
C In one cylinder, the gas particles are further apart.
D In one cylinder, the gas particles move faster.

11

32 The diagram shows a hand above a candle flame.



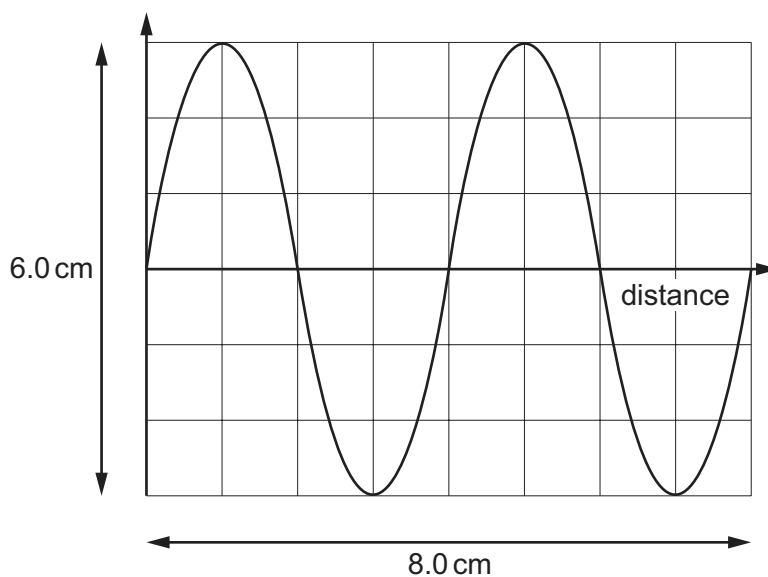
What is the main method by which thermal energy is transferred from the flame to the hand?

- A conduction
- B convection
- C evaporation
- D radiation

33 What is the main region of the electromagnetic spectrum involved in thermal energy transfer from the Sun to the Earth?

- A gamma
- B infrared
- C microwave
- D X-ray

34 The diagram represents a wave.

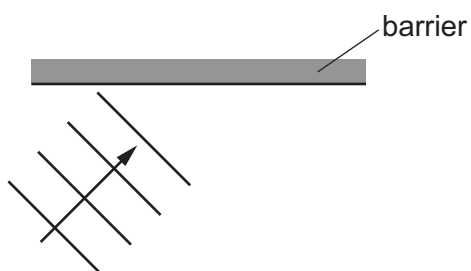


What is the wavelength of the wave?

- A 3.0 cm
- B 4.0 cm
- C 6.0 cm
- D 8.0 cm

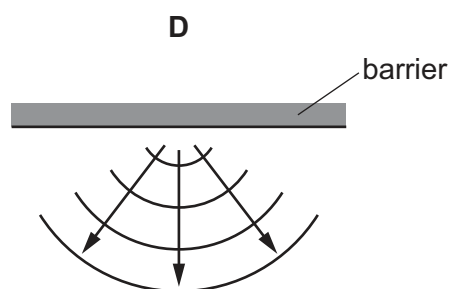
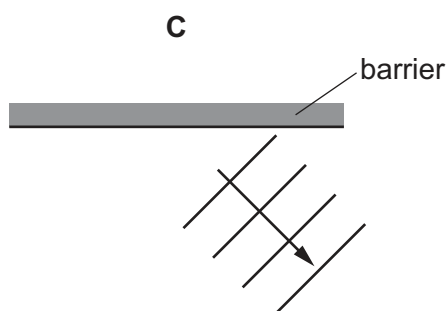
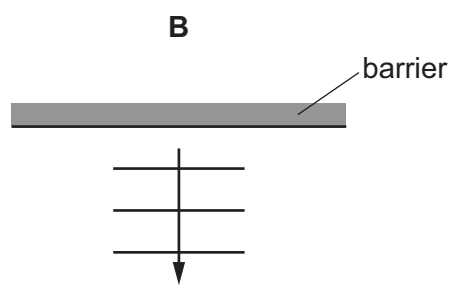
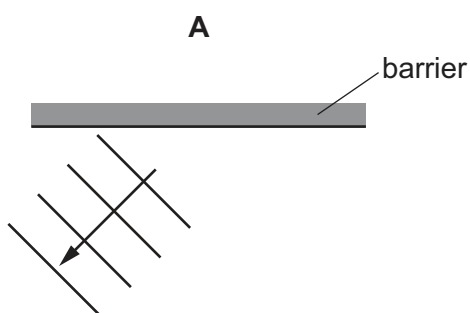
12

- 35** The diagram shows a wave on water moving towards a straight barrier. The direction of the wave is shown by an arrow.



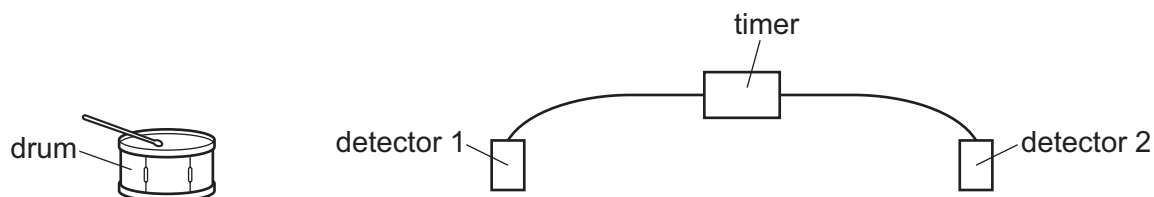
The wave reflects from the barrier.

Which diagram shows the reflected wave?



13

36 A student uses electronic equipment to determine the speed of sound in air.



The student hits the drum once.

When the sound reaches detector 1, the timer starts. When the sound reaches detector 2, the timer stops.

Which distance is needed to calculate the speed of sound in air?

- A** the distance from detector 1 to detector 2
- B** the distance from detector 1 to the timer
- C** the distance from the drum to detector 2
- D** the distance from the drum to the timer

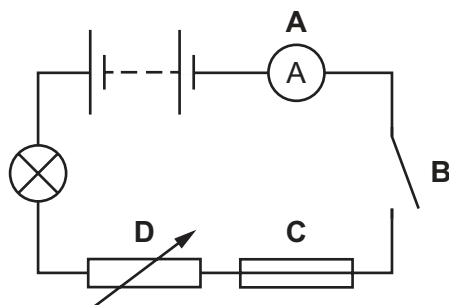
37 Which equations for power and energy transferred in an electrical component are correct?

	power	energy
A	$P = \frac{V}{I}$	$E = \frac{IV}{t}$
B	$P = \frac{V}{I}$	$E = IVt$
C	$P = IV$	$E = \frac{IV}{t}$
D	$P = IV$	$E = IVt$

14

38 When the switch in the circuit shown is closed, the lamp glows dimly.

Which labelled component is adjusted to make the lamp glow more brightly?



39 The current in a kettle is 8.4 A.

Which fuse rating is appropriate for a fuse used to protect the kettle?

A 5 A

B 8 A

C 13 A

D 30 A

40 How many stars are there in the Solar System?

A 1

B 2

C 8

D 9

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The Periodic Table of Elements

Group																			
I	II											III	IV	V	VI	VII	VIII		
		1 H hydrogen 1																	
		Key atomic number atomic symbol name relative atomic mass																	
3 Li lithium 7	4 Be beryllium 9													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													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	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.).