



Cambridge IGCSE™

CO-ORDINATED SCIENCES

0654/12

Paper 1 Multiple Choice (Core)

February/March 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.



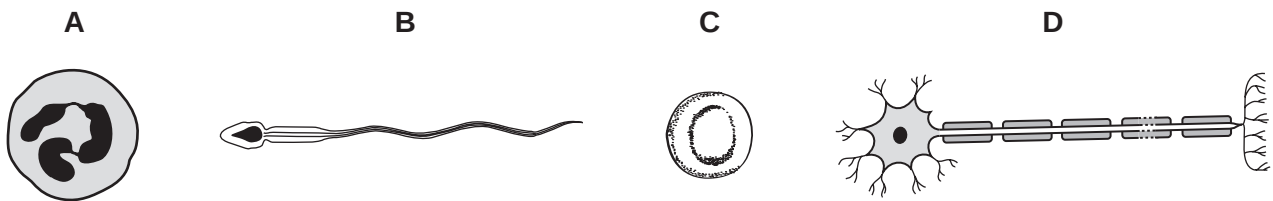
2

- 1 A scientist studies a living organism. The organism has the ability to remove the waste products of metabolism.

Which characteristic of living organisms does this show?

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

- 2 Which diagram shows a cell adapted to transport oxygen around the body?



- 3 Which leaf cell produces the most glucose?

- A palisade mesophyll
- B phloem
- C spongy mesophyll
- D xylem

- 4 Water is lost by evaporation from the cells of a leaf.

Which process replaces this water?

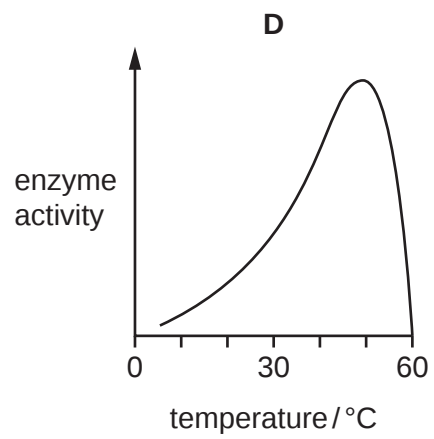
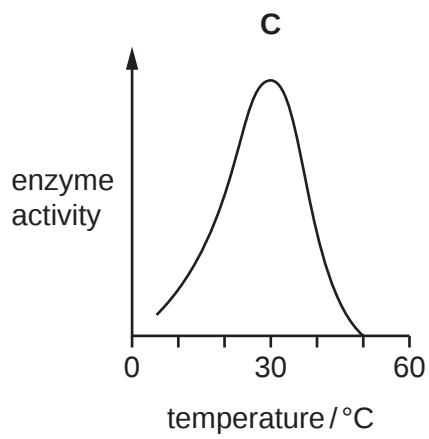
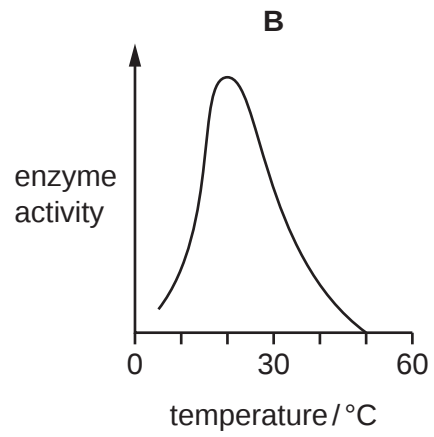
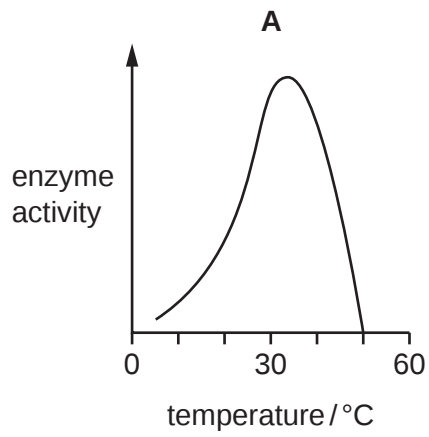
- A assimilation
- B egestion
- C osmosis
- D transpiration

- 5 What is the test for the presence of protein in a food sample?

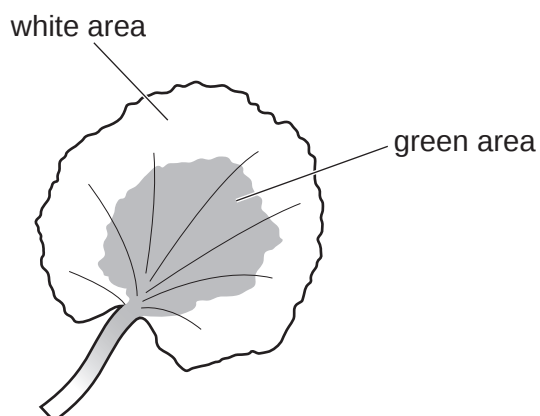
- A Benedict's solution
- B biuret test
- C ethanol emulsion
- D iodine solution

6 The graphs show the possible effects of temperature on enzyme activity.

Which graph is correct for a human enzyme?



- 7 The diagram shows a variegated leaf.



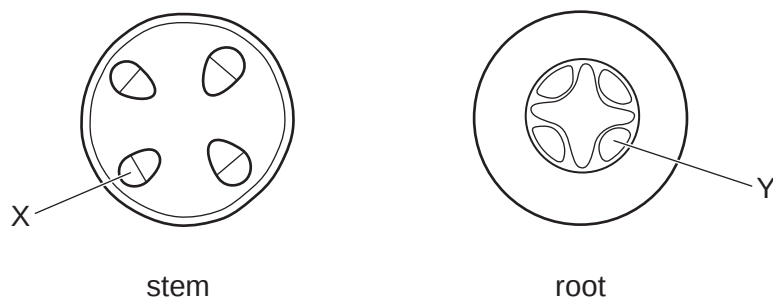
Which requirement for photosynthesis can be tested using this leaf but **not** using a completely green leaf?

- A carbon dioxide
 - B chlorophyll
 - C light
 - D water
- 8 A 5-year-old child has rickets.

Which nutrient is deficient in the child's diet?

- A carbohydrate
- B protein
- C vitamin C
- D vitamin D

- 9 The diagram shows a cross section of a plant stem and a plant root.



Which row identifies labels X and Y?

	X	Y
A	phloem	phloem
B	phloem	xylem
C	xylem	phloem
D	xylem	xylem

- 10 Which chamber of the human heart has the most muscular wall?

- A** left atrium
- B** left ventricle
- C** right atrium
- D** right ventricle

- 11 Which row shows the effect of physical activity on breathing?

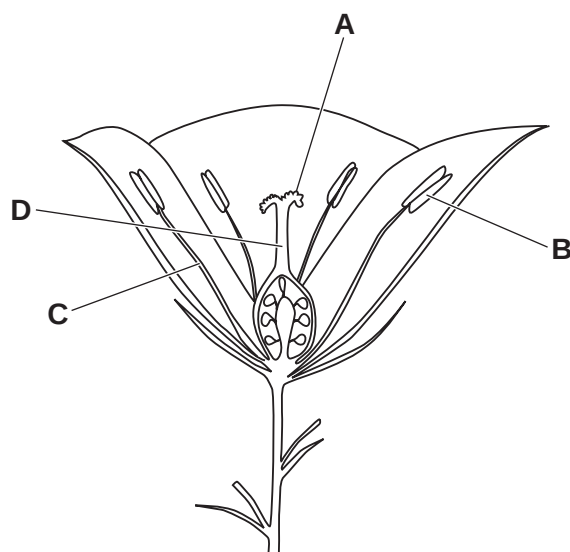
	rate of breathing compared to when at rest	depth of breathing compared to when at rest
A	faster	deeper
B	slower	deeper
C	faster	shallower
D	slower	shallower

- 12 What are the products of aerobic respiration?

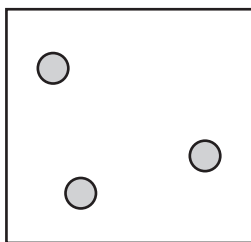
- A** carbon dioxide and water
- B** carbon dioxide and glucose
- C** oxygen and glucose
- D** oxygen and water

13 The diagram shows a cross section of a flower.

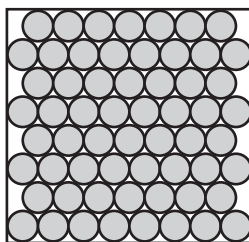
Which labelled part is the style?



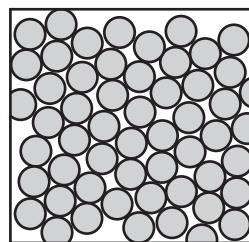
14 The three states of matter are represented by particle diagrams X, Y and Z.



X



Y



Z

Which row identifies each state of matter?

	solid	liquid	gas
A	Y	X	Z
B	Y	Z	X
C	X	Z	Y
D	Z	Y	X

15 One atom of an isotope of fluorine is represented by ${}^{15}_{9}\text{F}$.

How many neutrons does this atom have?

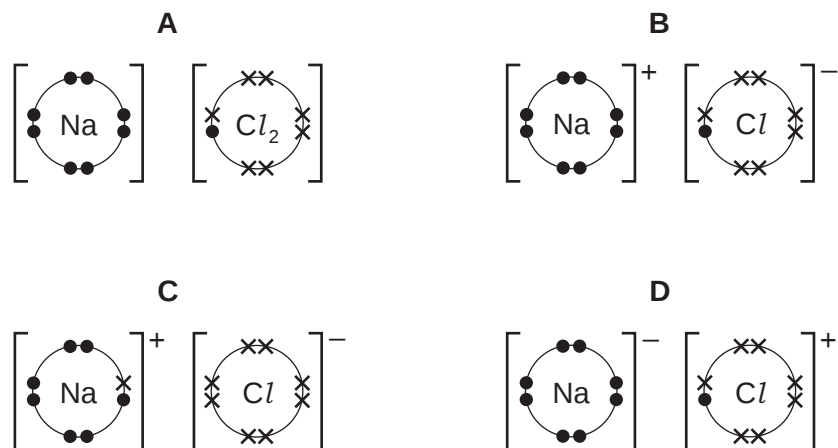
A 6

B 9

C 10

D 15

16 Which dot-and-cross diagram represents sodium chloride?



17 Which pair of elements forms a compound that does **not** conduct electricity when it is molten?

- A** carbon and hydrogen
- B** lithium and bromine
- C** magnesium and chlorine
- D** potassium and iodine

18 Magnesium hydroxide contains twice as many atoms of both oxygen and hydrogen than atoms of magnesium.

What is the formula of magnesium hydroxide?

- A** MgOH **B** MgO₂H₂ **C** Mg(OH)₂ **D** Mg₂(OH)

19 Concentrated aqueous sodium chloride is electrolysed using inert electrodes.

Which row shows the products at the electrodes?

	anode	cathode
A	chlorine	chlorine
B	chlorine	hydrogen
C	sodium	chlorine
D	sodium	hydrogen

- 20** The initial and final temperatures of four different experiments are measured.

Which experiment is the most endothermic?

	initial temperature / °C	final temperature / °C
A	20	19
B	20	27
C	21	26
D	22	20

- 21** The equation for the reaction between calcium carbonate and dilute hydrochloric acid is shown.



Which change increases the rate of this reaction?

- A** Decrease the temperature.
 - B** Increase the particle size of the calcium carbonate.
 - C** Increase the concentration of the acid.
 - D** Increase the volume of the acid.
- 22** Which row shows the types of oxide formed by magnesium and sulfur?

	magnesium	sulfur
A	acidic	acidic
B	acidic	basic
C	basic	acidic
D	basic	basic

23 Copper sulfate is made when copper carbonate is added to dilute sulfuric acid.

The copper carbonate is added until no more carbon dioxide is given off.

The mixture is1..... to remove excess copper carbonate.

The resulting solution is then2..... to decrease the volume.

This solution is then3..... to allow the formation of pure copper sulfate crystals.

Which words complete gaps 1, 2 and 3?

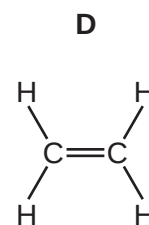
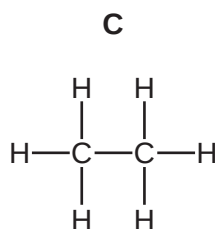
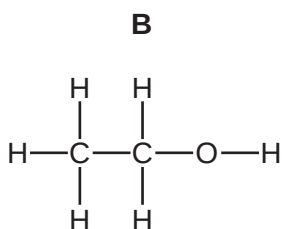
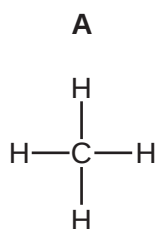
	1	2	3
A	boiled	heated	evaporated to dryness
B	filtered	cooled	left to cool
C	filtered	heated	evaporated to dryness
D	filtered	heated	left to cool

24 Sodium is below lithium in Group I of the Periodic Table.

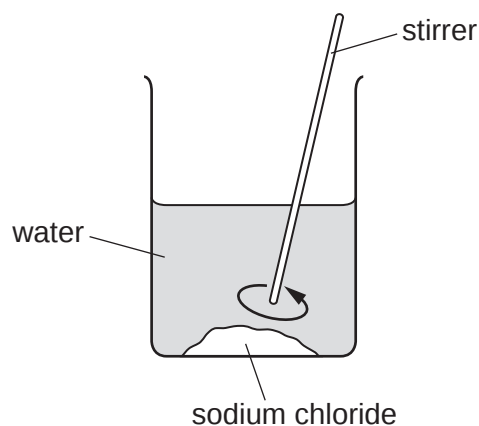
Which row describes the properties of sodium in comparison with lithium?

	melting point of sodium	reaction of sodium with water
A	higher than lithium	less vigorous than lithium
B	higher than lithium	more vigorous than lithium
C	lower than lithium	less vigorous than lithium
D	lower than lithium	more vigorous than lithium

25 Which structure represents a compound that has a chemical name ending in 'ene'?

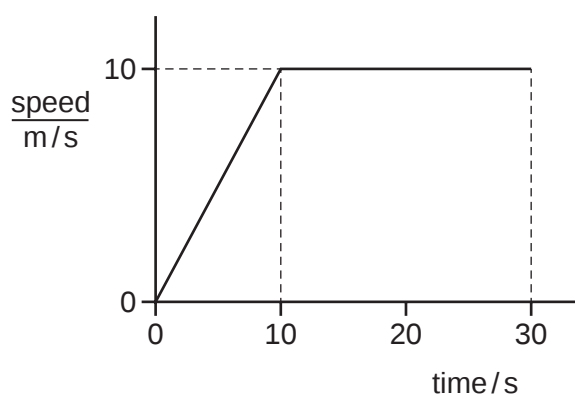


26 Sodium chloride is dissolved in water.



Which word describes the water used in this process?

- A solvent
 - B solution
 - C solute
 - D sediment
- 27 Which gas turns damp red litmus paper blue?
- A ammonia
 - B carbon dioxide
 - C chlorine
 - D hydrogen
- 28 The graph shows how the speed of a car varies with time.



Which distance does the car travel before it reaches a constant speed?

- A 10 m
- B 50 m
- C 100 m
- D 250 m

29 What is the density of an object that has a mass of 20 g and a volume of 5.0 cm³?

- A** 4.0 g/cm³ **B** 15 g/cm³ **C** 25 g/cm³ **D** 100 g/cm³

30 Which energy resource is non-renewable?

- A** geothermal
B natural gas
C tides
D wind

31 Which row shows a good thermal conductor and a bad thermal conductor?

	good conductor	bad conductor
A	copper	air
B	copper	silver
C	water	air
D	water	silver

32 In which situation is convection the main method of thermal energy transfer?

- A** heat from a heater on the floor of a room spreading around the room
B heat from a hot furnace reaching a factory worker standing beside it
C heat from the hot end of a metal spoon reaching a cook's hand holding the other end
D heat from the Sun reaching a worker in a field

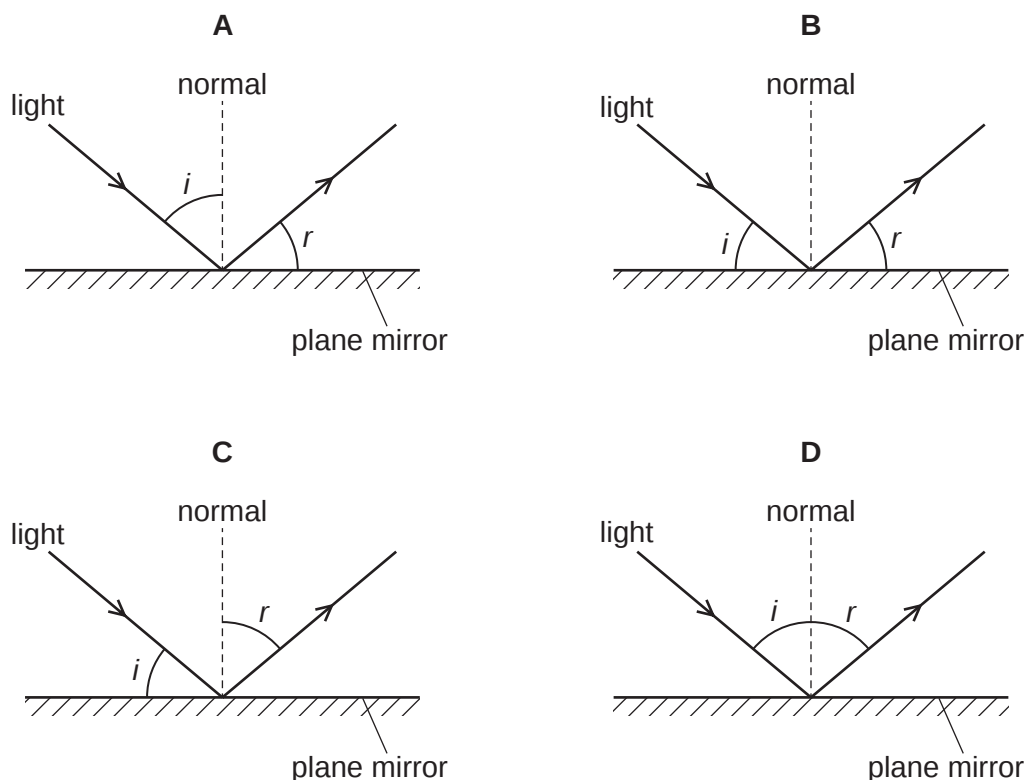
33 One property of a water wave is the number of crests on the surface of water that pass a particular point each second.

What is this property?

- A** amplitude
B frequency
C speed
D wavelength

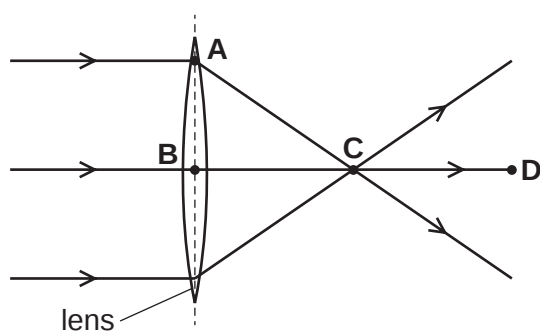
34 Light strikes a plane mirror and is reflected.

Which diagram shows the angle of incidence labelled i and the angle of reflection labelled r ?



35 The diagram shows light passing through a thin converging lens.

Which labelled point is the principal focus of the lens?



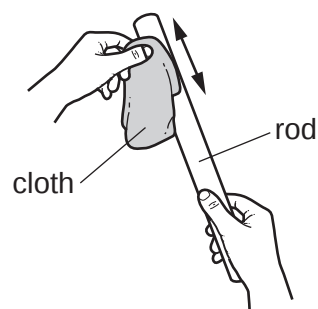
36 Which substance is used to make a permanent magnet?

- A** brass
- B** pure copper
- C** soft iron
- D** steel

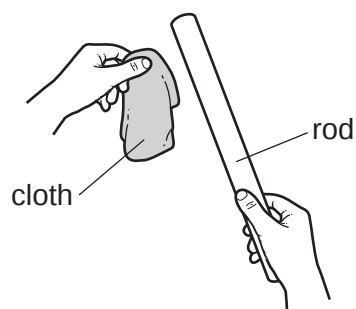
37 Which equation relates resistance R to current I and voltage V ?

- A** $R = I \times V$ **B** $R = \frac{I}{V}$ **C** $R = \frac{V}{I}$ **D** $R = I - V$

38 A student holds an iron rod in one hand and a dry cotton cloth in the other hand. The student rubs the iron rod with the cotton cloth several times. Next the student holds the cloth close to the iron rod.



rod rubbed with cloth



cloth held close to rod

The student then repeats this procedure with an identical dry cotton cloth and a plastic rod.

Which row shows the force between the iron rod and cloth and between the plastic rod and cloth when they are held close to each other after rubbing?

	force between iron rod and cloth	force between plastic rod and cloth
A	attraction	no force
B	no force	attraction
C	no force	repulsion
D	repulsion	repulsion

39 An atom emits radiation by radioactive decay.

Which part of the atom is the radiation emitted from?

- A** stable orbiting electrons
B stable nucleus
C unstable orbiting electrons
D unstable nucleus

- 40** The life cycle of a star depends on whether it has a small mass, a large mass or a very large mass.

What is the final stage of the life cycle of a large mass star?

- A** black hole
- B** planetary nebula
- C** neutron star
- D** supernova

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The Periodic Table of Elements

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

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.).