
COMBINED SCIENCE

5129/11

Paper 1 Multiple Choice

May/June 2019

1 hour

Additional Materials: Multiple Choice Answer Sheet
 Soft clean eraser
 Soft pencil (type B or HB is recommended)



READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.

DO NOT WRITE IN ANY BARCODES.

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 separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

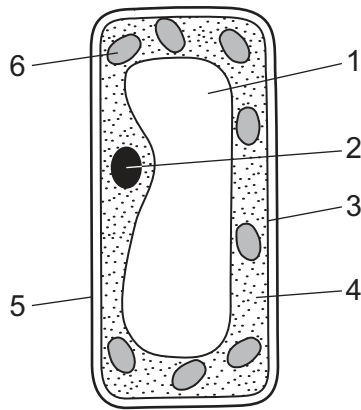
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.

This document consists of **15** printed pages and **1** blank page.

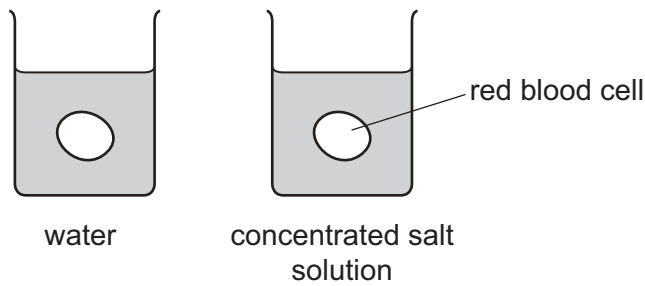
1 The diagram shows a plant cell.



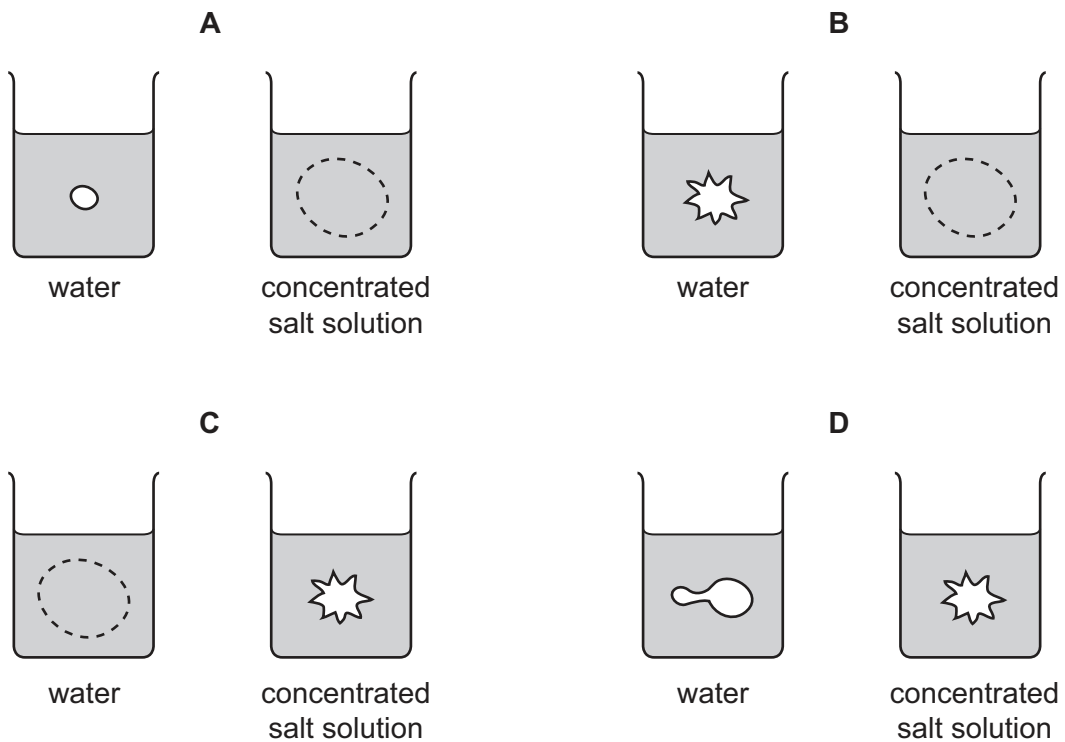
Which cell structures are also present in animal cells?

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

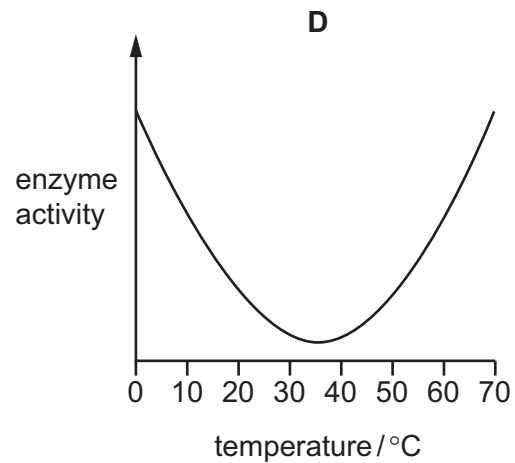
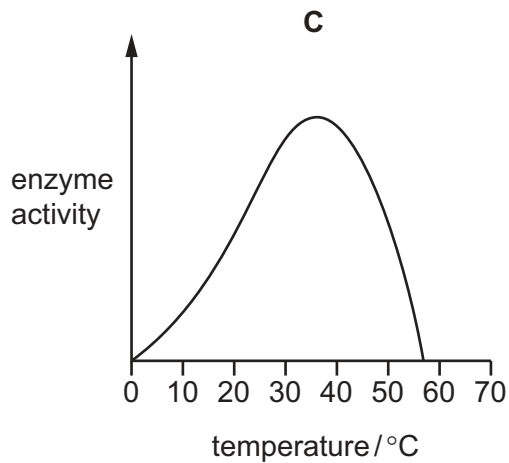
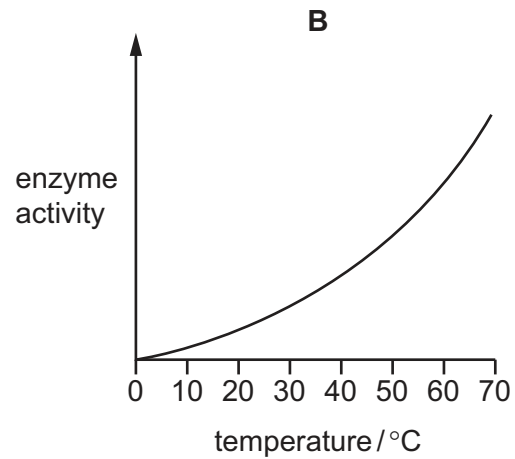
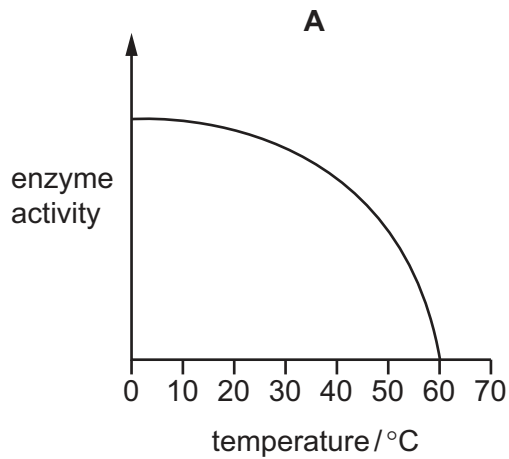
2 One beaker contains water. Another beaker contains a concentrated salt solution. A red blood cell is placed into each beaker.



Which diagram shows the appearance of the cells after 15 minutes?



- 3 Which graph shows how the activity of an enzyme in the human alimentary canal varies with temperature?



- 4 Which gas, produced in photosynthesis, is released through the stomata?

- A** carbon dioxide
- B** oxygen
- C** sulfur dioxide
- D** water vapour

- 5 Which row shows the causes of constipation and obesity?

	constipation	obesity
A	lack of carbohydrates	excess of carbohydrates
B	lack of carbohydrates	excess of protein
C	lack of fibre	excess of carbohydrates
D	lack of fibre	excess of vitamins

6 Which statement describes transpiration?

- A the flow of a sugary solution inside a stem
- B the loss of water vapour through stomata
- C the movement of mineral ions down a stem
- D the release of energy in plant cells

7 Which row describes a vein?

	walls	valves
A	thick	no
B	thick	yes
C	thin	no
D	thin	yes

8 Which statement explains why, even when athletes have finished a race, they carry on breathing more quickly and deeply than normal?

- A to remove carbon dioxide produced during anaerobic respiration
- B to remove urea produced by the breakdown of amino acids
- C to replace stored glycogen in muscles
- D to take in extra oxygen to break-down lactic acid

9 The breakdown of glucose in respiration produces carbon dioxide as a waste product.

How is carbon dioxide removed from the body?

- A breathed out by the lungs
- B egested from the anus
- C excreted in the urine
- D lost through the skin in sweat

10 What happens to hormones after they have had their effect on target organs?

- A absorbed by the blood
- B destroyed by the liver
- C digested by the stomach
- D excreted by the kidneys

11 Which statement describes a drug?

- A an externally administered substance that modifies chemical reactions
- B an externally administered substance that modifies physical reactions
- C an internally administered substance that modifies chemical reactions
- D an internally administered substance that modifies physical reactions

12 Air pollution can affect gaseous exchange surfaces in the lungs.

Which statements (in general) about individuals exposed to polluted air are correct?

- 1 They will tire easily.
- 2 They will be susceptible to respiratory infections.
- 3 Their lungs will get bigger.
- 4 They will be able to run for a longer period of time.

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

13 Which row shows an example of each type of birth control?

	chemical	hormonal	surgical
A	condom	spermicide	vasectomy
B	pill	vasectomy	condom
C	spermicide	pill	vasectomy
D	vasectomy	condom	pill

14 Which statement about gases is correct?

- A Particles are close together in a random arrangement.
- B Particles are close together in a regular arrangement.
- C Particles are far apart in a random arrangement.
- D Particles vibrate about fixed positions in a regular arrangement.

15 What is the definition of nucleon number?

- A the number of neutrons in an atom
- B the total number of neutrons and electrons in an atom
- C the total number of protons and electrons in an atom
- D the total number of protons and neutrons in an atom

16 The table gives the electronic structure of four elements.

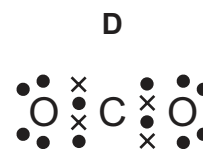
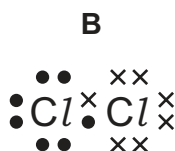
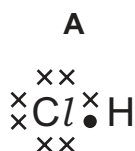
The letters in the table are not the usual symbols of the elements.

element	electronic structure
W	2,7
X	2,8,5
Y	2,8,6
Z	2,8,8,2

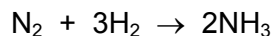
Which two elements form an ionic compound?

- A** W and X **B** W and Y **C** W and Z **D** X and Y

17 Which dot and cross diagram of a molecule is **not** correct?



18 The equation for the formation of ammonia, NH_3 , in the Haber process is shown.



What is the mass of ammonia made from 14 g of nitrogen?

- A** 17 g **B** 28 g **C** 34 g **D** 68 g

19 The table shows the pH value of 5 soil samples.

soil sample	pH value
P	8.0
Q	7.5
R	7.0
S	6.5
T	6.0

Cabbages grow best in alkaline soil.

In which soil samples should cabbage grow best?

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

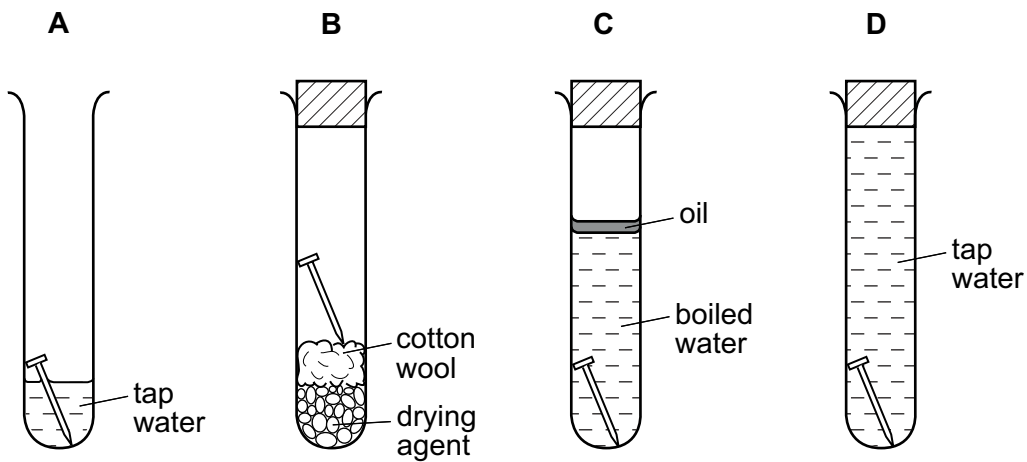
23 Which statements about zinc are correct?

- 1 It is alloyed with copper to form brass.
- 2 It is used to make food containers.
- 3 It is alloyed with iron to make steel.
- 4 It is used to coat iron for rust prevention.

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

24 A student set up an experiment using iron nails as shown. The tubes are left for one week.

In which tube does most rusting take place?



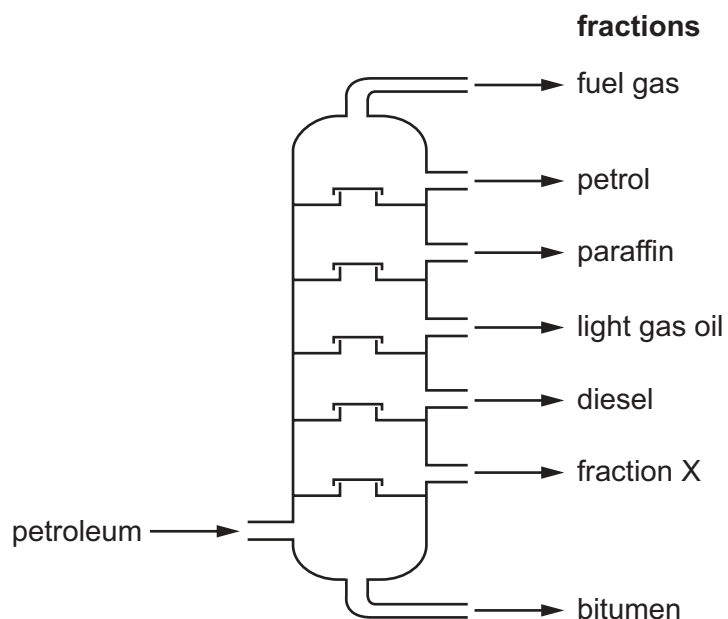
25 A student suggests the following four statements about the members of a homologous series.

- 1 They have similar chemical properties.
- 2 They have the same melting points.
- 3 Their molecules all contain at least two carbon atoms.
- 4 They can be represented by the same general formula.

Which statements are correct?

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

26 The fractional distillation of petroleum is shown.



What is a use of fraction X?

- A fuel for an aircraft
- B fuel for an oil stove
- C making roads
- D making waxes

27 P, Q, R and S are four hydrocarbons.

P has no C=C double bonds.

Q is saturated.

R undergoes an addition reaction with steam.

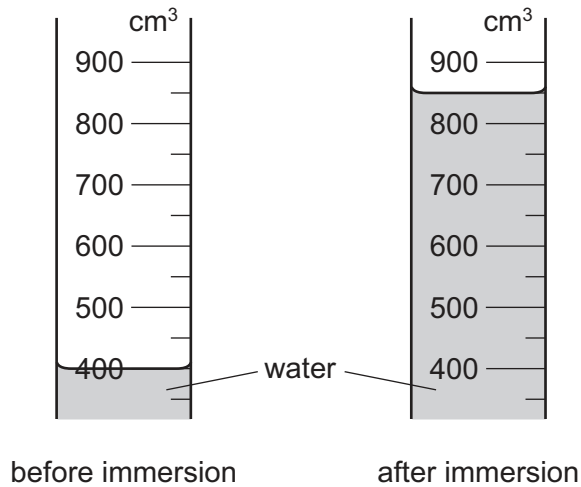
S can form an addition polymer.

Which row is correct?

	P	Q	R	S
A	ethane	ethene	propene	ethene
B	methane	ethane	ethene	propane
C	propane	methane	propene	ethene
D	propene	ethene	methane	ethane

28 The volume of an irregularly shaped solid object is measured by the method of displacement.

The water levels before and after the solid is added are shown.



What is the volume of the irregularly shaped object?

- A** 400 cm³ **B** 450 cm³ **C** 850 cm³ **D** 1250 cm³

29 A force is applied to an object moving at constant velocity.

Which effect **cannot** occur?

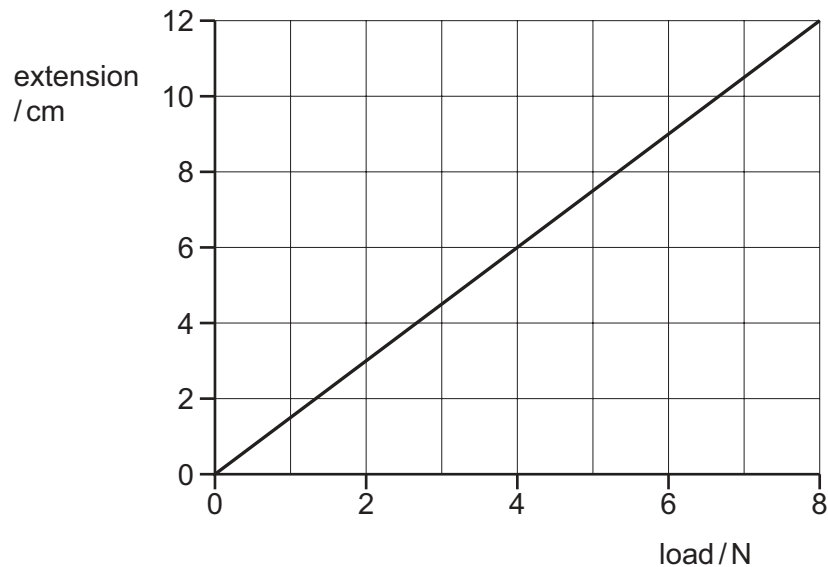
- A** It slows down.
B It speeds up.
C Its direction changes.
D Its velocity remains constant.

30 An astronaut has a mass of 84.0 kg on the Earth where the gravitational field strength is 10 N/kg. He goes to Mars where the field strength is 38% of that on the Earth.

Which row is correct?

	mass on Mars /kg	weight on Mars /N
A	31.9	121
B	31.9	319
C	84.0	319
D	84.0	840

31 The diagram shows an extension-load graph for a spring.



The length of the spring with no load is 3 cm.

Which load gives the spring a length of 9 cm?

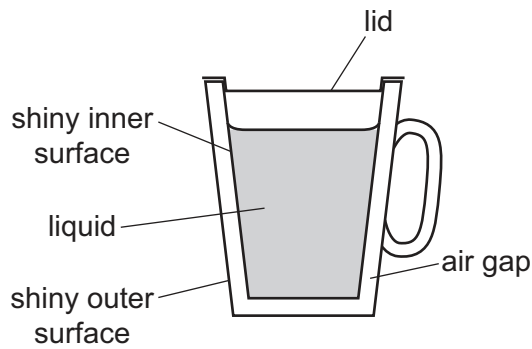
- A** 2 N **B** 4 N **C** 6 N **D** 8 N

32 Hydroelectric generation can be used to produce electricity from water stored behind a dam.

What is the correct order for the energy transfers during the production of electricity in this way?

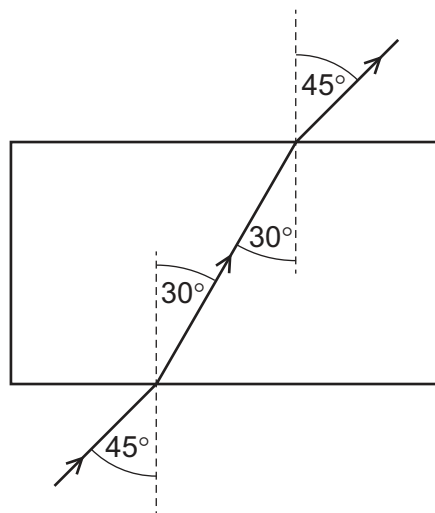
- A** kinetic energy of turbine → gravitational potential energy of water → kinetic energy of water → electrical energy
- B** gravitational potential energy of water → kinetic energy of water → kinetic energy of turbine → electrical energy
- C** gravitational potential energy of water → kinetic energy of turbine → kinetic energy of water → electrical energy
- D** kinetic energy of water → kinetic energy of turbine → gravitational potential energy of water → electrical energy

33 A liquid is kept hot in an insulated cup.



Which statement does **not** explain why the liquid stays hot?

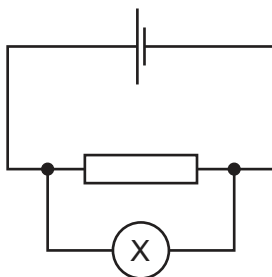
- A The trapped air in the gap reduces convection.
 - B The lid reduces convection.
 - C The shiny inner surface reflects infra-red radiation from the liquid.
 - D The shiny outer surface reflects infra-red radiation from the surroundings.
- 34 Which description could be a longitudinal wave?
- A an earthquake wave
 - B infra-red radiation
 - C vibrations on a guitar string
 - D X-rays
- 35 The diagram shows a ray of light passing through a transparent rectangular block.



What is the refractive index of the block for the light ray **entering** the block?

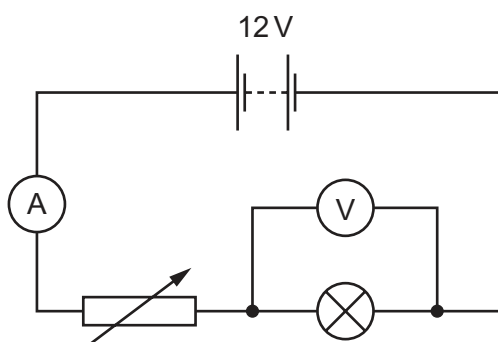
- A 0.71
- B 0.82
- C 1.41
- D 1.50

- 36 The diagram shows a voltmeter connected in parallel to a resistor in a circuit.



Which unit can be used for the quantity measured by the voltmeter?

- A C/s B J/C C J/s D V/ Ω
- 37 The circuit shown is used to determine the resistance of a lamp for two different brightness settings.



When the brightness of the lamp is low, the voltmeter reading is 2V and the ammeter reading is 2A.

When the brightness of the lamp is normal, the readings are 12V and 4A.

What is the increase in filament resistance?

- A 1 Ω B 2 Ω C 3 Ω D 4 Ω
- 38 The wiring for a home appliance includes a switch and a fuse.

Where are these located?

	switch	fuse
A	live wire	live wire
B	live wire	neutral wire
C	neutral wire	live wire
D	neutral wire	neutral wire

- 39 In the nuclide notation A_ZX , what is represented by the letter Z?
- A the number of neutrons in the nuclide
 - B the number of protons in the nuclide
 - C the total number of neutrons and protons in the nuclide
 - D the total number of protons and electrons in the nuclide
- 40 A smoke alarm in a home uses radioactive emissions that are easily absorbed. The detector needs to last for at least ten years before replacing.

Which nuclide is the best for use in a smoke detector?

	nuclide	radiation emitted	half-life
A	americium-241	alpha	432 years
B	cobalt-60	beta	5.27 years
C	potassium-40	beta	1.25×10^9 years
D	radium-223	alpha	11.5 days

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The Periodic Table of Elements

		Group																																		
I	II	III	IV	V	VI	VII	VIII																													
3 Li lithium 7	4 Be beryllium 9	11 Na sodium 23	12 Mg magnesium 24	19 K potassium 39	20 Ca calcium 40	37 Rb rubidium 85	55 Cs caesium 133	87 Fr francium —	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	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	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 —	114 Fl flerovium —	116 Lv livermorium —	118 Og oganeson —	119 Uue unbinilium —	120 Uub ununbium —	121 Uut ununtrium —	122 Uuq ununquadium —	123 Uup ununpentium —	124 Uuq ununhexium —	125 Uuh ununheptium —	126 Uuo ununoctium —	127 Uuq ununnonium —	128 Uuq unundecium —	129 Uuq ununtridecium —	130 Uuq ununquadecium —	131 Uuq ununpentadecium —	132 Uuq ununhexadecium —	133 Uuq ununseptendecium —	134 Uuq ununoctadecium —	135 Uuq ununnonadecium —	136 Uuq ununtriacontium —	137 Uuq ununtriacontium —	138 Uuq ununtriacontium —	139 Uuq ununtriacontium —	140 Uuq ununtriacontium —

Key

atomic number
atomic symbol
name
relative atomic mass

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
actinoids	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.).