



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE

0653/11

Paper 1 Multiple Choice (Core)

May/June 2017

45 minutes

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

* 1 5 0 0 2 8 6 3 9 0 *

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 20.

Electronic calculators may be used.

This document consists of **17** printed pages and **3** blank pages.

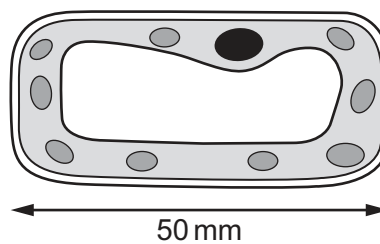
1 Process Q happens in cells.

carbohydrates → process Q → energy released

What is process Q?

- A growth
- B nutrition
- C respiration
- D sensitivity

2 The diagram shows an image of a plant cell that has been magnified.



The actual length of the cell is 0.02 mm.

How many times has the cell been magnified?

- A × 10 B × 100 C × 250 D × 2500

3 Which statements about enzymes are correct?

- 1 Enzymes are proteins.
- 2 Some enzymes carry out chemical digestion.
- 3 Enzymes speed up the rate of chemical reactions.
- 4 All enzymes work fastest at pH 7.

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

- 4 The table shows the results when four foods are tested with Benedict's solution and biuret reagent.

Which food contains protein but **not** reducing sugar?

	colour obtained with Benedict's solution	colour obtained with biuret reagent
A	blue	green
B	blue	violet
C	red	green
D	red	violet

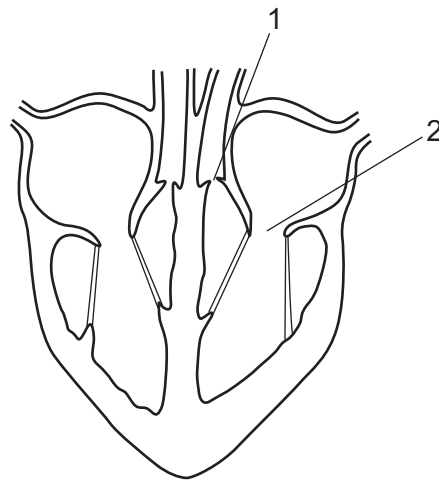
- 5 What are the products of photosynthesis?

- A** carbohydrates + oxygen
- B** carbohydrates + water
- C** carbon dioxide + oxygen
- D** carbon dioxide + water

- 6 During transpiration, from which part of a leaf does evaporation of water occur?

- A** cuticle
- B** mesophyll cells
- C** stomata
- D** xylem

7 The diagram shows a section through the heart.

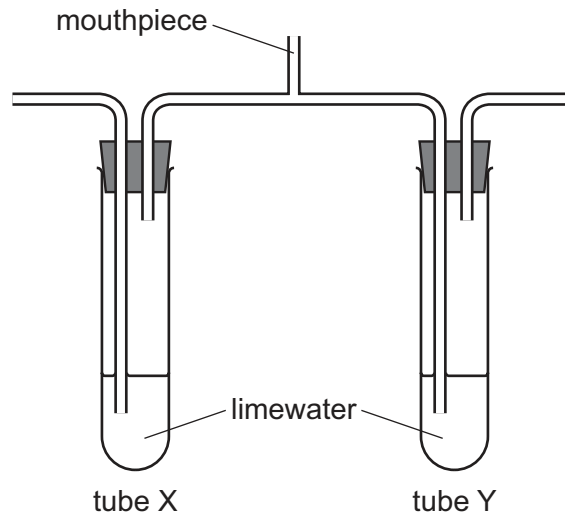


The ventricles contract and blood is forced into the arteries.

What is the state of valves 1 and 2 when this happens?

	valve 1	valve 2
A	closed	closed
B	closed	open
C	open	closed
D	open	open

- 8 The diagram shows apparatus at the start of a breathing experiment.



A person breathes in and out through the mouthpiece for a short time.

Which row shows the results?

	limewater in tube X	limewater in tube Y
A	stays clear	stays clear
B	stays clear	turns cloudy
C	turns cloudy	stays clear
D	turns cloudy	turns cloudy

- 9 Which statement about hormones in humans is correct?

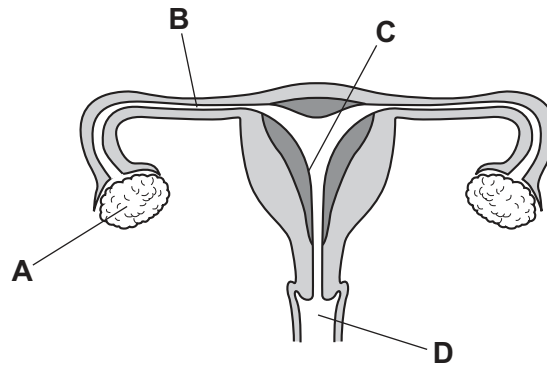
- A** They are destroyed by the liver.
- B** They are destroyed by the pancreas.
- C** They are produced by target organs.
- D** They are produced by the blood.

- 10 Which part of a plant protects the flower when it is a bud?

- A** petal
- B** sepal
- C** stem
- D** stigma

11 The diagram shows the female reproductive system.

Where does implantation of the embryo normally occur?



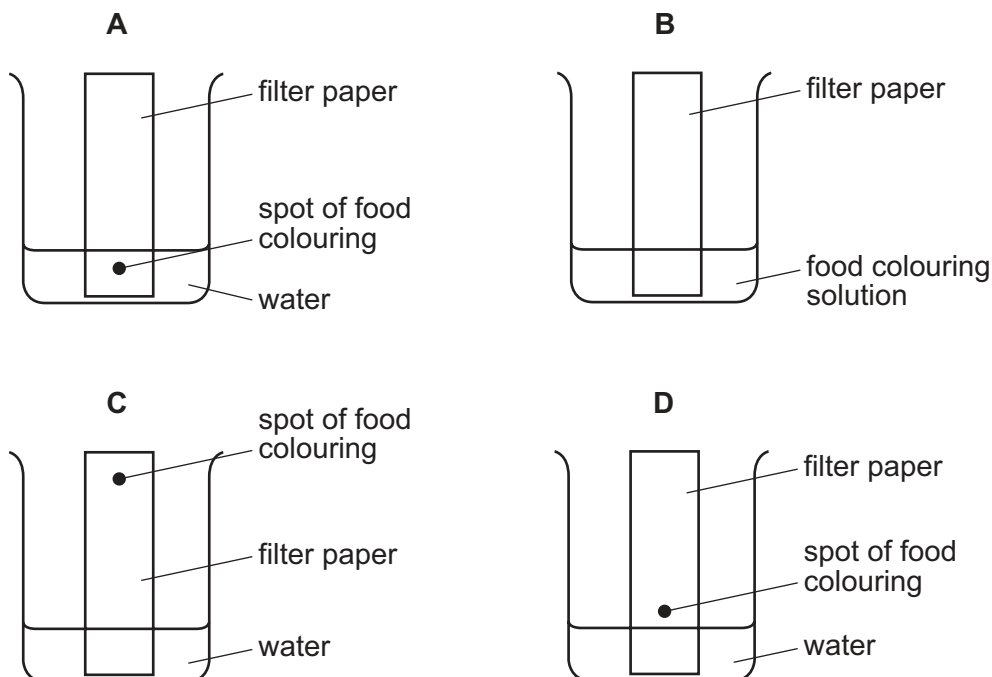
12 Which type of organism makes its own organic nutrients?

- A carnivore
- B consumer
- C herbivore
- D producer

13 What is **not** an effect of deforestation?

- A extinction of plant species
- B flooding of river valleys
- C increase of oxygen in the air
- D loss of soil by erosion

14 Which diagram shows how a mixture of dyes in a food colouring are separated?



15 Which process produces a chemical change?

- A adding ethanol to water
- B adding sodium to water
- C boiling water
- D melting ice

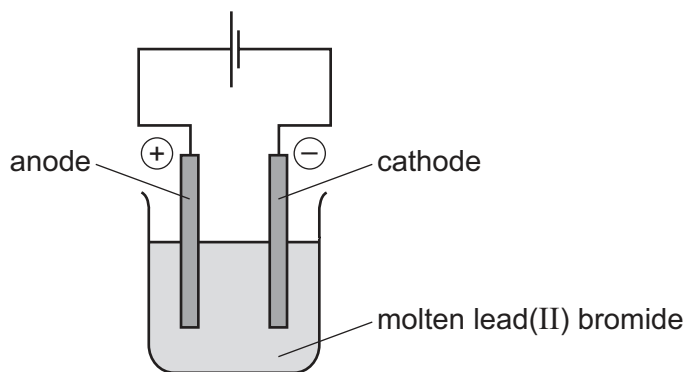
16 Sodium and potassium are Group I metals.

Chlorine and bromine are Group VII non-metals.

Which statement describes the formation of a covalent bond?

- A Potassium and bromine combine by sharing a pair of electrons.
- B Sodium and chlorine combine by electron loss and gain.
- C Two bromine atoms combine by electron loss and gain.
- D Two chlorine atoms combine by sharing a pair of electrons.

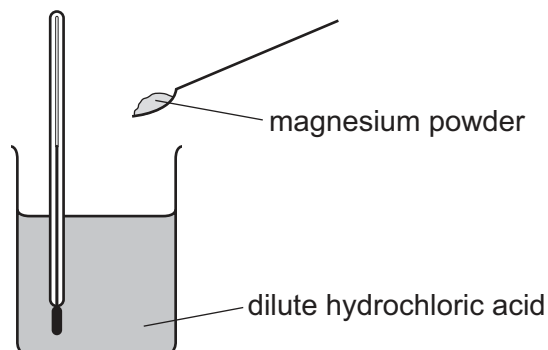
17 The diagram shows the electrolysis of molten lead(II) bromide.



What is produced at the electrodes?

	anode	cathode
A	brown gas	colourless gas
B	brown gas	grey liquid
C	colourless gas	brown gas
D	grey liquid	brown gas

18 The diagram shows how the temperature change is measured when magnesium powder reacts with dilute hydrochloric acid.



Thermometer reading before adding magnesium powder = 20.6 °C

Thermometer reading after adding magnesium powder = 32.4 °C

Which statement is correct?

- A** The reaction is endothermic and gives out heat.
- B** The reaction is endothermic and takes in heat.
- C** The reaction is exothermic and gives out heat.
- D** The reaction is exothermic and takes in heat.

19 Hydrogen peroxide decomposes to form water and oxygen.

Which changes in temperature and in concentration **both** reduce the rate of this reaction?

	temperature of hydrogen peroxide	concentration of hydrogen peroxide
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

20 In which word equation is copper reduced?

- A** anhydrous copper sulfate + water → hydrated copper sulfate
- B** copper carbonate + hydrochloric acid → copper chloride + water + carbon dioxide
- C** copper oxide + hydrogen → copper + water
- D** copper + oxygen → copper oxide

21 Magnesium hydroxide is an insoluble solid.

Magnesium sulfate is a soluble solid which is formed when magnesium hydroxide reacts with sulfuric acid.

Which method is used to make **pure** magnesium sulfate?

- A** React excess dilute sulfuric acid with magnesium hydroxide, filter and crystallise.
- B** React excess dilute sulfuric acid with magnesium hydroxide then evaporate until dry.
- C** React excess magnesium hydroxide with dilute sulfuric acid, filter and crystallise.
- D** React excess magnesium hydroxide with dilute sulfuric acid then evaporate until dry.

22 Acidified barium nitrate solution is added to solution X. A white precipitate forms.

What is X?

- A** hydrochloric acid
- B** limewater
- C** potassium chloride
- D** sulfuric acid

23 The diagram shows part of the Periodic Table.

The letters U to Z are **not** the symbols of the elements.

I	II											III	IV	V	VI	VII	VIII
U																Y	Z
															X		
	V						W										

Which elements are metals?

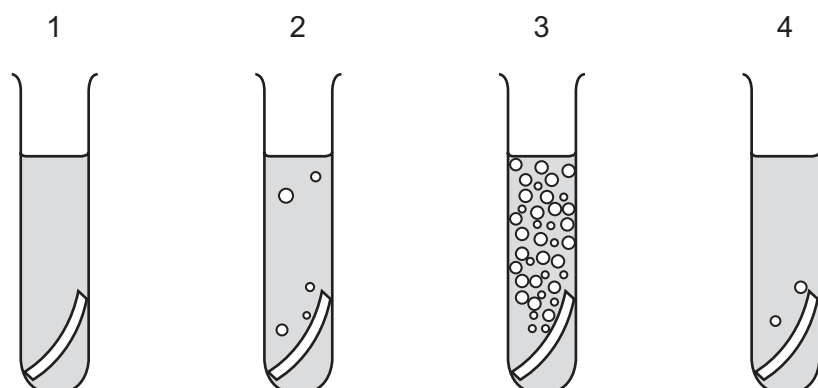
- A** U, V and W **B** U and V only **C** W and X **D** X, Y and Z

24 What is an alloy?

- A** a compound containing two metallic elements
B a compound containing two non-metallic elements
C a mixture containing two metallic elements
D a mixture containing two non-metallic elements

25 Equal sized pieces of four different metals are added to separate samples of dilute hydrochloric acid.

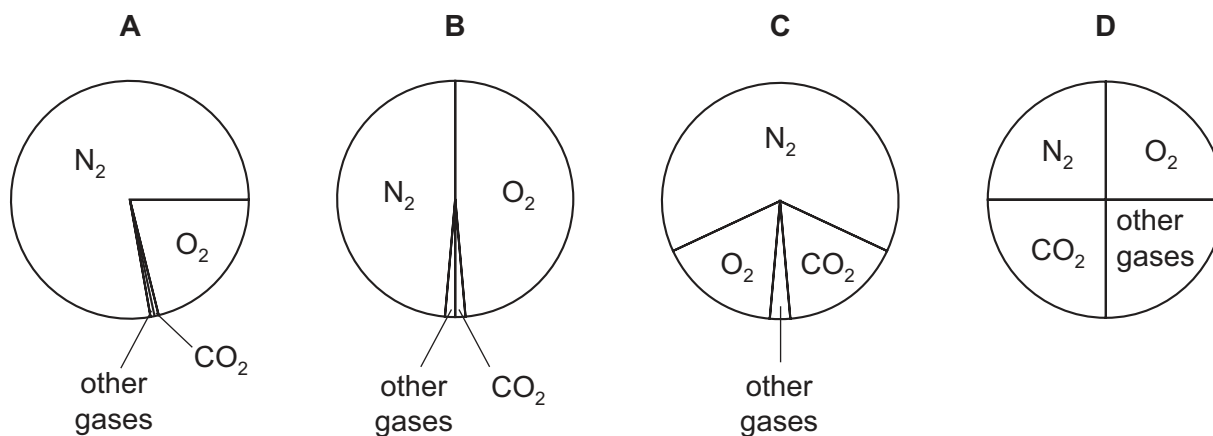
The results are shown.



Which row identifies the metals in the tubes?

	tube 1	tube 2	tube 3	tube 4
A	calcium	copper	sodium	iron
B	copper	iron	potassium	sodium
C	copper	magnesium	calcium	zinc
D	iron	zinc	copper	magnesium

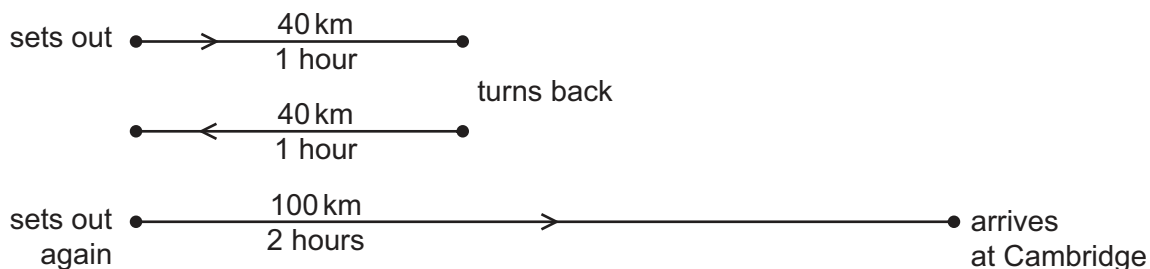
26 Which pie chart shows the proportions of gases in clean air?



27 Which property of the compounds in petroleum is used to separate it into useful fractions?

- A** boiling point
- B** density
- C** melting point
- D** solubility

- 28 A car driver sets out from home to travel to Cambridge. After 1 hour he is 40 km from home. He discovers that he must return home to collect his briefcase. This journey also takes him 1 hour. He sets off again immediately. He reaches Cambridge, 100 km from home, 2 hours later.



What is the average speed for the whole of his journey from leaving home the first time?

- A 25 km/h B 45 km/h C 50 km/h D 90 km/h
- 29 Which row shows the unit for force, the unit for mass and the unit for weight?

	force	mass	weight
A	kg	kg	N
B	kg	N	kg
C	N	kg	N
D	N	N	kg

- 30 A heavy ball is dropped from the top of a tower.

Which form of energy decreases as the ball falls?

- A gravitational
 B kinetic
 C thermal
 D sound
- 31 Which force does the greatest amount of work?
- A a force of 10 N moving an object a distance of 3.0 m
 B a force of 10 N moving an object a distance of 5.0 m
 C a force of 15 N moving an object a distance of 3.0 m
 D a force of 15 N moving an object a distance of 5.0 m

32 A liquid changes into a gas and this causes the temperature of the liquid to change.

What is the name of this process, and how does the temperature change?

	name of process	temperature change
A	condensation	decreases
B	condensation	increases
C	evaporation	decreases
D	evaporation	increases

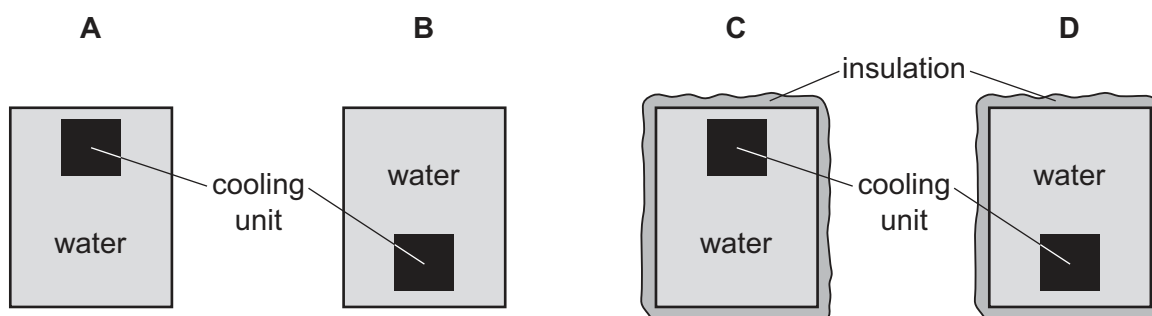
33 Four identical metal tanks in a room each contain the same amount of water.

The water is at the same temperature as the room.

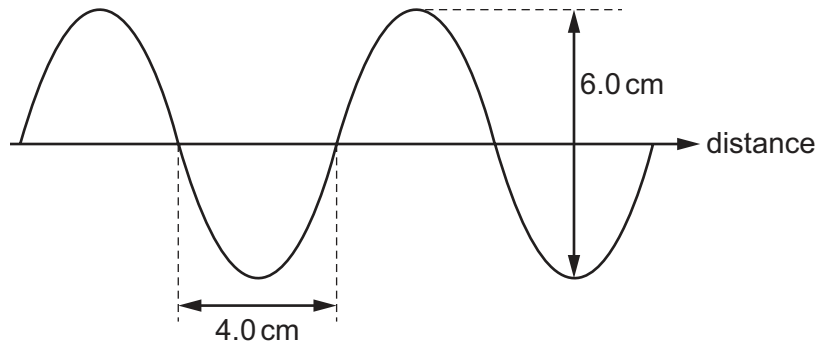
Two of the tanks are insulated, and two of the tanks are not insulated.

A cooling unit is placed in each of the tanks, in the position shown.

In which tank does all the water become cool the most quickly?



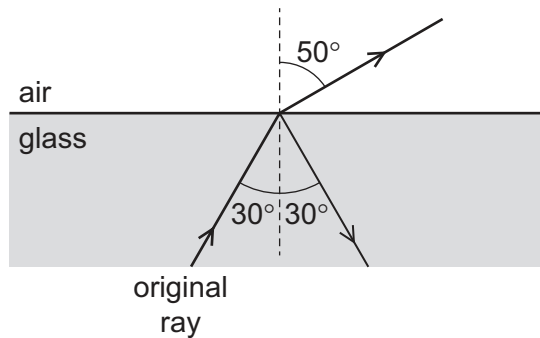
- 34 The diagram represents a wave on the surface of water. Some measurements are shown.



Which row gives the amplitude and the wavelength of the wave?

	amplitude / cm	wavelength / cm
A	3.0	4.0
B	3.0	8.0
C	6.0	4.0
D	6.0	8.0

- 35 A ray of light is travelling in glass. The ray reaches a boundary with air and splits into two rays as shown.



What has happened to the original ray?

- A** It has been partially internally reflected.
- B** It has been partially internally refracted.
- C** It has been totally internally reflected.
- D** It has been totally internally refracted.

36 Which electromagnetic wave is used by a remote controller for a television?

- A infra-red
- B microwaves
- C radio
- D ultraviolet

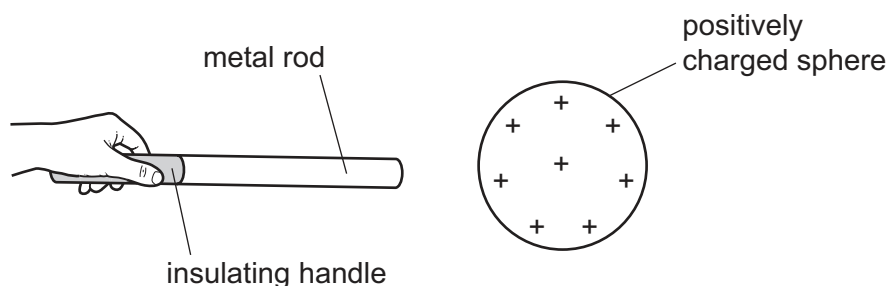
37 An electronic circuit in a fire alarm makes a loudspeaker vibrate alternately at two different frequencies.

Which pair of frequencies is suitable to use in the alarm to alert people to the danger of fire?

- A 1.5 Hz and 15 Hz
- B 15 Hz and 150 000 Hz
- C 150 Hz and 15 000 Hz
- D 150 000 Hz and 15 000 000 Hz

38 An uncharged metal rod is held by an insulating handle.

The rod is brought near to a positively charged sphere. This causes some particles in the rod to move.



Which particles in the rod move and in which direction do the particles move?

	particles that move	direction of movement
A	electrons	away from the sphere
B	electrons	towards the sphere
C	protons	away from the sphere
D	protons	towards the sphere

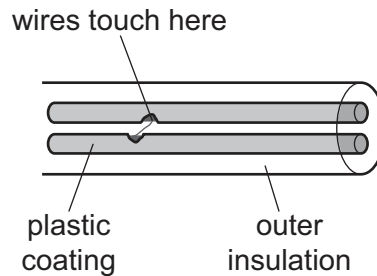
39 A power supply causes a current in a circuit.

The potential difference (p.d.) of the power supply and the resistance of the circuit are both changed.

Which pair of changes **must** result in a smaller current in the circuit?

	p.d.	resistance
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

40 Each wire inside a cable leading from an electric socket to a hairdryer is covered with a plastic coating. This plastic coating splits and the two wires inside the cable touch each other.



What could happen because of this?

- A** An appliance plugged into a different socket could become switched on.
- B** A large current could flow in the wires making them overheat to cause a fire.
- C** A person near the hairdryer could receive an electric shock.
- D** The hairdryer plugged into the socket could be damaged.

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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	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> Key atomic number atomic symbol name relative atomic mass </div>										2 He helium 4					
11 Na sodium 23	12 Mg magnesium 24											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
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 —	114 Fl flerovium —	116 Lv livermorium —	—	—	—	—

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.).