



Cambridge IGCSE™

COMBINED SCIENCE

0653/13

Paper 1 Multiple Choice (Core)

May/June 2023

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. Any blank pages are indicated.

1 What is a characteristic of all living things?

- A egestion
- B ingestion
- C nutrition
- D photosynthesis

2 Which structure is found only in plant cells?

- A cell membrane
- B cytoplasm
- C large vacuole
- D nucleus

3 A student tests a liquid with Benedict's solution and iodine solution.

The results are shown.

test	result
Benedict's solution	orange-red colour
iodine solution	orange-brown colour

Which nutrients are present in the liquid?

	reducing sugar	starch
A	✓	✓
B	✓	x
C	x	✓
D	x	x

4 During photosynthesis, plants use energy from which source?

- A air
- B soil
- C water
- D Sun

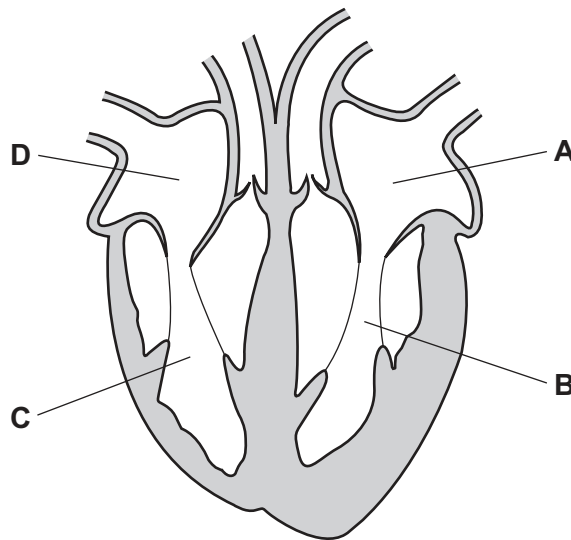
5 Which row matches the part of the alimentary canal to its function?

	part of the alimentary canal	function of part
A	anus	absorption
B	oesophagus	digestion
C	mouth	ingestion
D	small intestines	egestion

6 Which row shows the effects of increasing humidity and temperature on the rate of transpiration of a plant?

	increasing humidity	increasing temperature
A	decreases	increases
B	decreases	decreases
C	increases	decreases
D	increases	increases

7 From which chamber does the blood leave the heart to travel to the organs of the body?



- 8 A student carries out vigorous exercise for 10 minutes.

Which statements are correct for what happens during the exercise?

- 1 The pulse rate increases.
- 2 The depth of breathing increases.
- 3 The rate of breathing increases.

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

- 9 Which situation is most likely to cause a sudden rise in the release of adrenaline into the blood?

- A** beginning gentle exercise
- B** being startled or alarmed
- C** digestion of food during a meal
- D** going to sleep when drowsy

- 10 Which definition of asexual reproduction is correct?

- A** production of genetically different offspring from one parent
- B** production of genetically different offspring from two parents
- C** production of genetically identical offspring from one parent
- D** production of genetically identical offspring from two parents

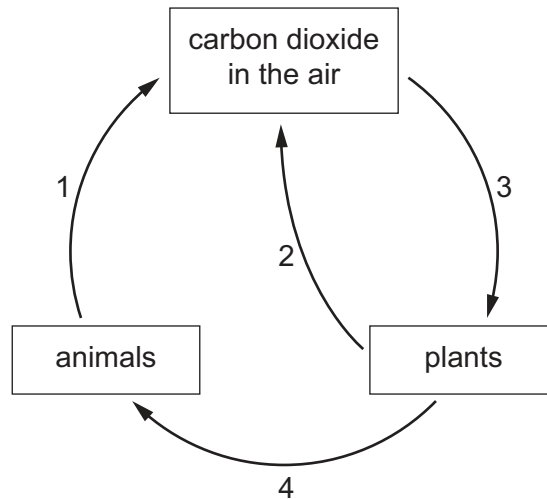
- 11 Which environmental conditions are normally necessary for seed germination?

	light	oxygen	suitable temperature	water
A	no	yes	no	yes
B	no	yes	yes	yes
C	yes	no	yes	no
D	yes	yes	yes	yes

- 12 Which name is given to the ball of cells that can implant into the wall of the uterus?

- A** embryo
- B** gamete
- C** ovum
- D** zygote

13 The diagram shows part of the carbon cycle.

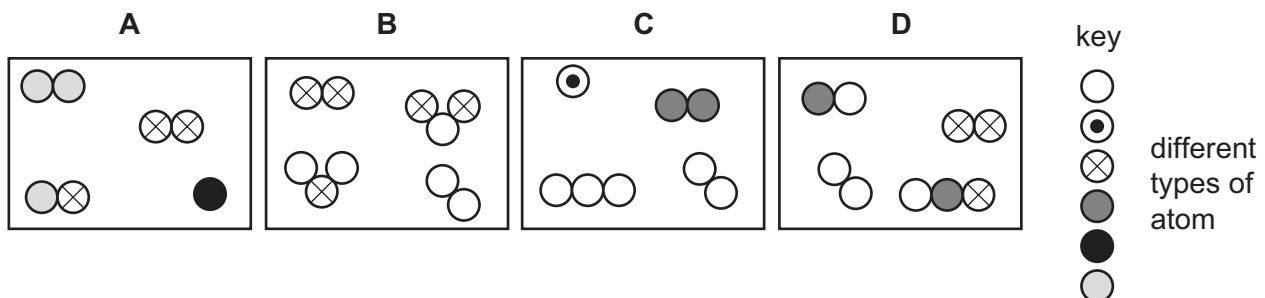


Which labels represent respiration?

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

14 The diagrams show four different mixtures of gases.

Which diagram represents a mixture containing **only** elements?

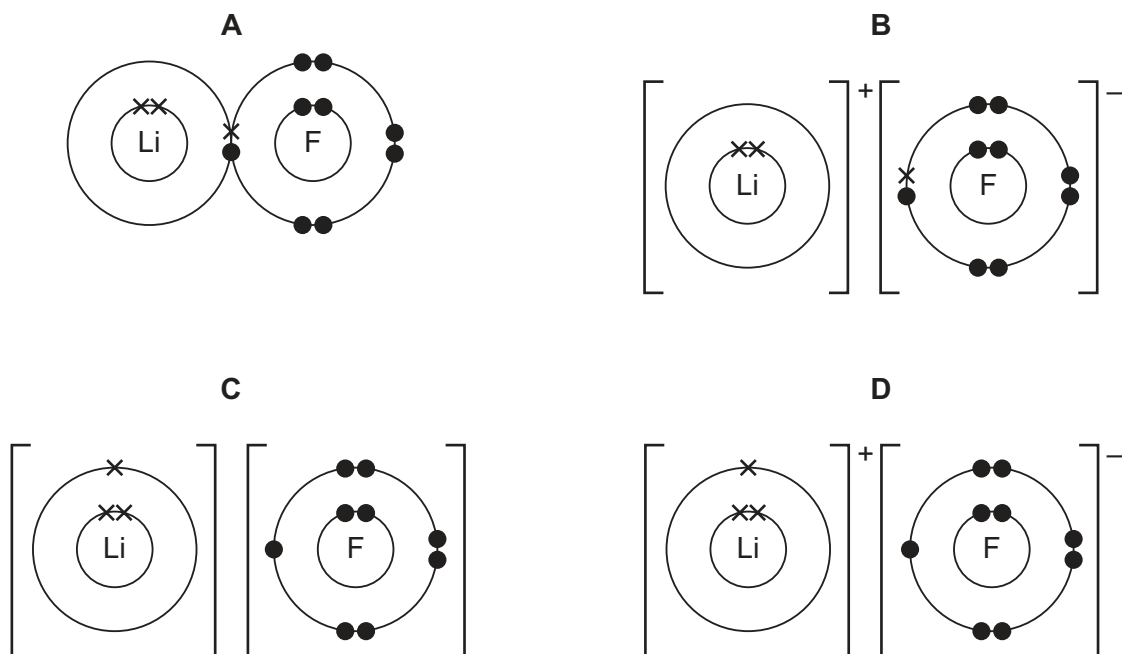


15 The nucleon number of an atom of chlorine is 35.

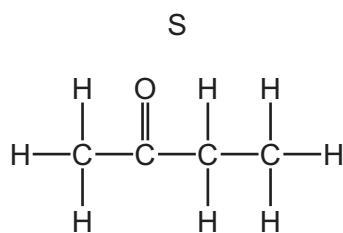
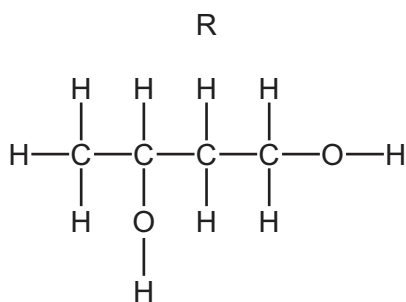
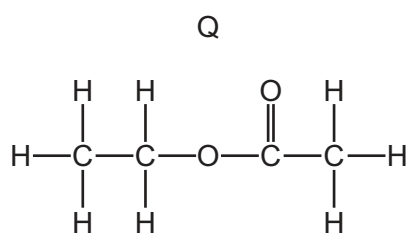
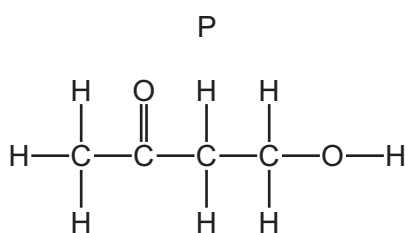
Which statement about this atom is correct?

- A** It contains the same number of neutrons as electrons.
B It contains the same number of protons as neutrons.
C It contains the same number of protons as electrons.
D The numbers of protons, neutrons and electrons are all different from each other.

16 Which dot-and-cross diagram represents lithium fluoride, LiF?



17 The molecular structures of four compounds are shown.

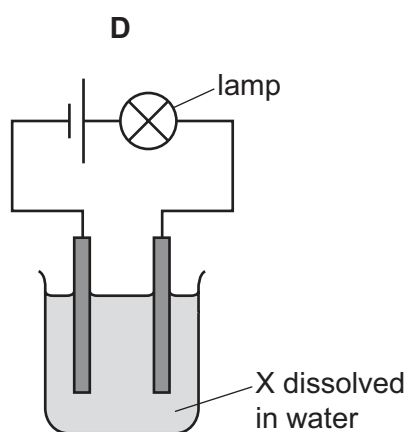
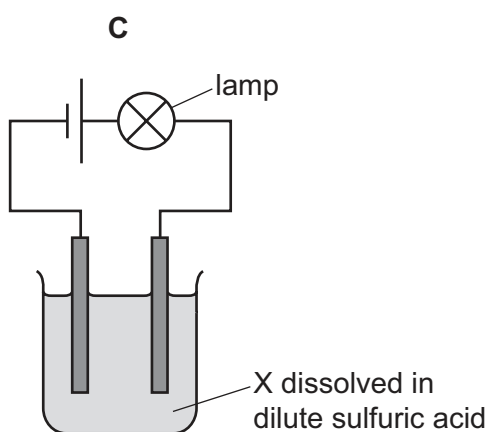
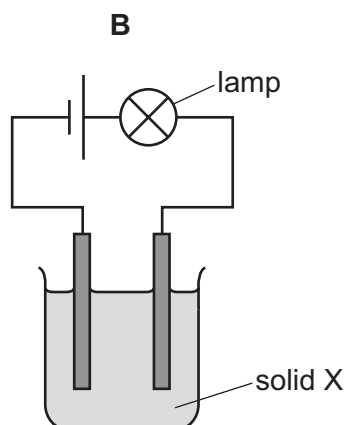
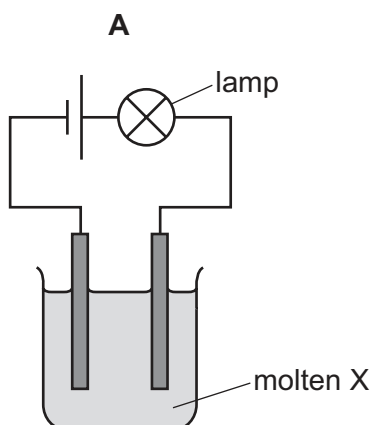


Which compounds have the molecular formula $\text{C}_4\text{H}_8\text{O}_2$?

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

18 X is an ionic compound.

In which experiment does the lamp **not** light up?



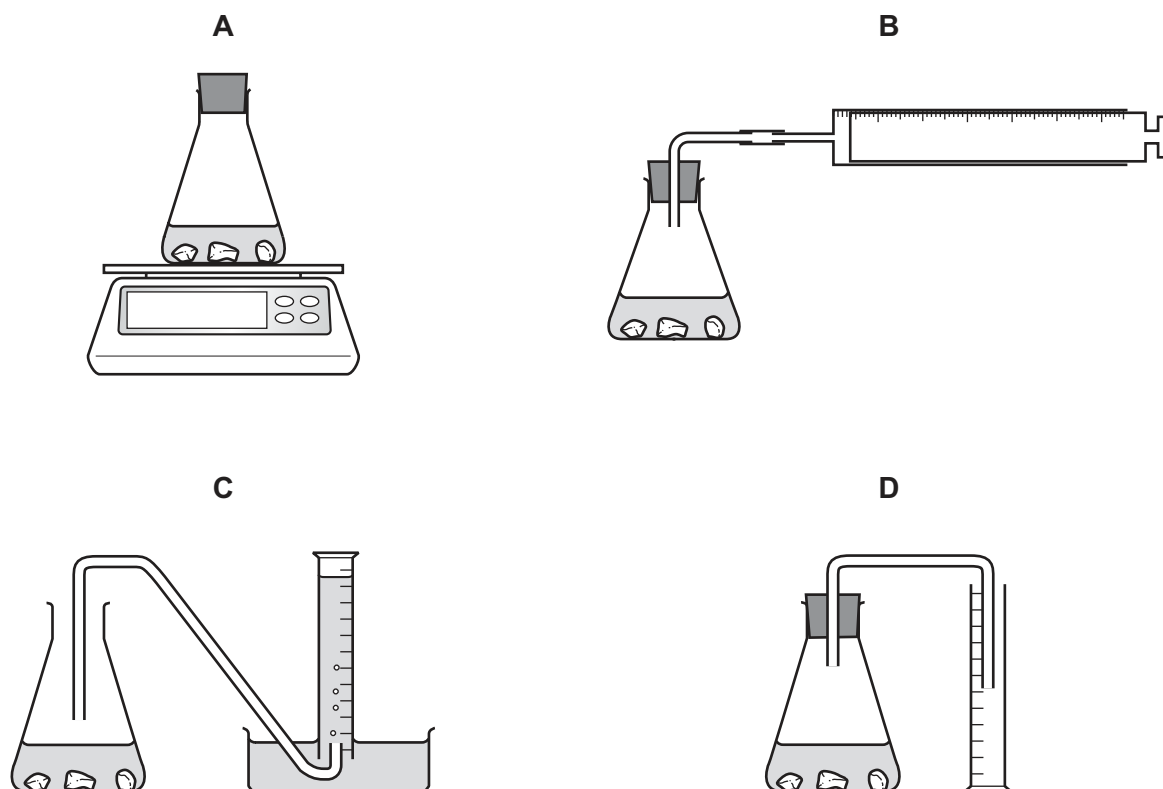
19 Powdered zinc reacts with a blue solution of copper(II) sulfate.

Which observation shows that the reaction is exothermic?

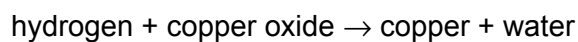
- A** A red-brown solid forms.
- B** Some grey solid remains after the reaction.
- C** The blue colour of the solution fades.
- D** The temperature increases.

20 Zinc reacts with dilute sulfuric acid to form zinc sulfate and hydrogen.

Which apparatus is suitable for investigating the rate of this reaction?



21 The word equation for the reaction between hydrogen and copper oxide is shown.



Which substance, shown in the word equation, is reduced in the reaction?

- A** copper
- B** copper oxide
- C** hydrogen
- D** water

22 Which two substances both react with dilute sulfuric acid to make the salt magnesium sulfate?

- A** magnesium carbonate and magnesium chloride
- B** magnesium chloride and magnesium nitrate
- C** magnesium oxide and magnesium carbonate
- D** magnesium oxide and magnesium nitrate

23 The results of two tests on a white solid are shown.

	test	result
1	add aqueous sodium hydroxide	white precipitate formed
2	add dilute hydrochloric acid	colourless gas formed

What is the white solid?

- A** iron(II) carbonate
- B** iron(II) chloride
- C** zinc carbonate
- D** zinc chloride

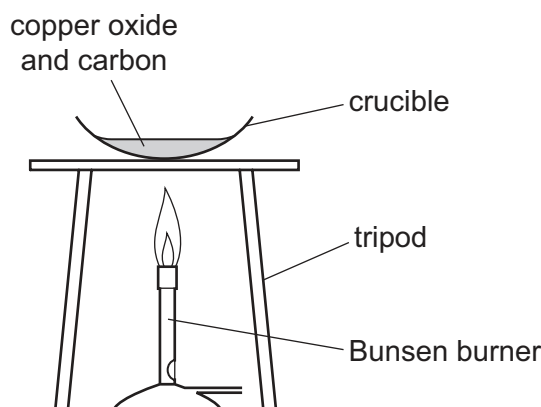
24 Two non-metallic elements, X and Y, are in the same group of the Periodic Table.

X is higher in the group than Y.

Which row shows the group number that includes elements X and Y and which element is lighter in colour?

	group number	lighter in colour
A	I	X
B	I	Y
C	VII	X
D	VII	Y

25 Copper oxide is heated with carbon as shown.



Which statement about this experiment is correct?

- A A pink-brown solid is formed.
- B Carbon is placed underneath the copper oxide so that the air can react with the hot copper oxide.
- C Carbon reacts with the air to form carbon dioxide which then reacts with the copper oxide.
- D Copper is more reactive than carbon.

26 Which statement about a pollutant in the air is correct?

- A Carbon dioxide is produced by the incomplete combustion of fossil fuels.
- B Carbon monoxide causes acid rain.
- C Oxides of nitrogen blacken the surface of buildings.
- D Sulfur dioxide causes breathing difficulties.

27 Which statement about propane is correct?

- A It is the main constituent of natural gas.
- B It is a very reactive substance.
- C It is a saturated hydrocarbon.
- D It reacts rapidly with aqueous bromine.

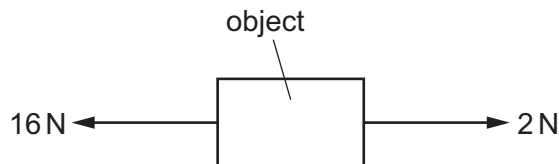
28 Which piece of apparatus is used when determining the volume of a small irregularly shaped stone?

- A a balance
- B a clock
- C a measuring cylinder
- D a ruler

29 Which statement about mass and weight is correct?

- A Mass and weight are different types of force.
- B The mass of an object depends on the strength of the gravitational field in which it is placed.
- C The mass of an object is the same on the Moon as it is on the Earth.
- D The unit of weight is the kilogram.

30 Two forces act on an object as shown.



What is the resultant force on the object?

- A 14 N to the left
 - B 14 N to the right
 - C 18 N to the left
 - D 18 N to the right
- 31 A motor is used to lift a certain number of bricks through a certain height in a certain time.
- Which action requires the motor to use a greater power?
- A lifting an equal number of bricks through a smaller height in an equal time
 - B lifting an equal number of bricks through an equal height in a greater time
 - C lifting an equal number of bricks through an equal height in a smaller time
 - D lifting fewer bricks through an equal height in an equal time
- 32 The generator in a power station is rotated by a turbine. Steam from boiling water rotates the turbine.
- Which energy source is used to produce electricity in this way?
- A hydroelectric energy
 - B nuclear fission
 - C tidal energy
 - D wind energy

33 Which statement describes the molecules in a gas?

- A** They are close together and move about quickly.
- B** They are close together and move about slowly.
- C** They are far apart and move about quickly.
- D** They are far apart and move about slowly.

34 A strip of brass and a strip of steel are glued together to make a single strip.

The diagrams show the strip at room temperature and at a high temperature.

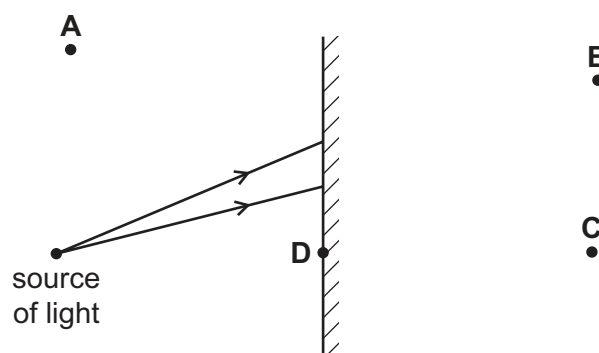


Which statement explains why the strip bends in this way when it is heated?

- A** Brass does not expand but steel contracts.
- B** Brass expands but steel contracts.
- C** Brass expands less than steel expands.
- D** Brass expands more than steel expands.

35 A source of light is placed in front of a plane mirror.

Which labelled point shows the position of the image of the source?



36 X-rays and radio waves are electromagnetic waves.

Which statement is correct?

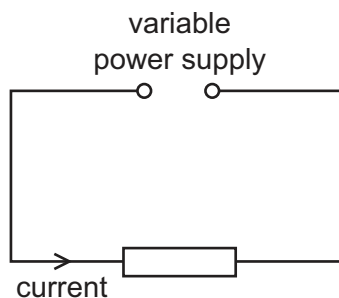
- A X-rays have greater frequencies than radio waves and travel at the same speed in a vacuum.
- B X-rays have greater frequencies than radio waves and travel faster in a vacuum.
- C X-rays have smaller frequencies than radio waves and travel at the same speed in a vacuum.
- D X-rays have smaller frequencies than radio waves and travel faster in a vacuum.

37 An uncharged object becomes positively charged by friction.

What happens during this process?

- A Electrons are added to the object.
- B Electrons are removed from the object.
- C Protons are added to the object.
- D Protons are removed from the object.

38 A variable power supply is connected to a resistor and there is a current in the resistor.



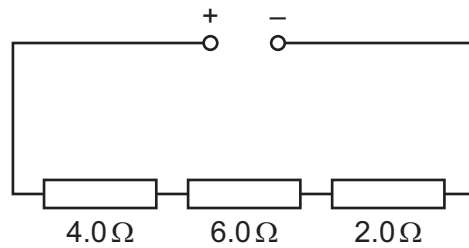
The potential difference (p.d.) across the resistor is decreased.

The temperature of the resistor does not change.

What happens to the current in the resistor and what happens to the resistance of the resistor?

	current	resistance
A	decreases	increases
B	decreases	stays the same
C	increases	decreases
D	increases	stays the same

- 39 The diagram shows a power supply connected to a $4.0\ \Omega$ resistor, a $6.0\ \Omega$ resistor and a $2.0\ \Omega$ resistor.



Which statement about current is correct?

- A The current is greatest in the $2.0\ \Omega$ resistor.
 - B The current is greatest in the $4.0\ \Omega$ resistor.
 - C The current is greatest in the $6.0\ \Omega$ resistor.
 - D The current is the same in each of the resistors.
- 40 An electric heater has a label stating this information: 240 V, 2400 W, 10 A.
- What is written on a fuse with a rating that is appropriate for use with this heater?
- A 5 A B 13 A C 230 V D 250 V

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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	Key atomic number atomic symbol name relative atomic mass	1 H hydrogen 1																																																																													
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 —
										5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20																																																																	

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	euporium	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 dm^3 at room temperature and pressure (r.t.p.).