



Cambridge O Level

COMBINED SCIENCE

5129/11

Paper 1 Multiple Choice

May/June 2020

1 hour

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.

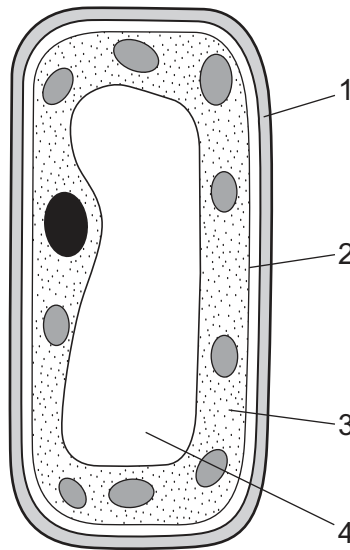
INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Blank pages are indicated.



1 The diagram shows a plant cell.



Which structures are the cell membrane, cell wall and cytoplasm?

	cell membrane	cell wall	cytoplasm
A	1	2	3
B	1	2	4
C	2	1	3
D	2	1	4

2 Carbon dioxide moves into and out of cells by diffusion.

Which statement is correct for a plant cell that is photosynthesising in bright sunlight?

- A** Carbon dioxide diffuses into the cell because the concentration of carbon dioxide is higher outside the cell than inside the cell.
- B** Carbon dioxide diffuses out of the cell because the concentration of carbon dioxide is higher outside the cell than inside the cell.
- C** Carbon dioxide diffuses into the cell because the concentration of carbon dioxide is lower outside the cell than inside the cell.
- D** Carbon dioxide diffuses out of the cell because the concentration of carbon dioxide is lower outside the cell than inside the cell.

3 Which type of molecule is an enzyme?

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

4 Which diet is most likely to lead to obesity?

- A drinking no alcohol
- B eating only meat
- C eating too much fibre
- D eating too much carbohydrate

5 A student was studying animal nutrition.

He wrote down descriptions of some processes that take place.

- 1 breakdown of food into smaller pieces to increase the surface area
- 2 contraction of the circular and longitudinal muscles in the gut wall
- 3 movement of digested food products across the small intestine wall
- 4 production of enzymes for the chemical breakdown of food

Which two describe the processes of chewing and peristalsis?

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

6 Which sequence shows the flow of blood from the body through the heart to the lungs?

- A aorta → left ventricle → left atrium → pulmonary vein
- B left atrium → left ventricle → right ventricle → right atrium
- C pulmonary artery → right ventricle → left ventricle → left atrium
- D vena cava → right atrium → right ventricle → pulmonary artery

7 Which statements describe excretion?

- 1 Excretion can be the removal of the waste products of metabolism.
- 2 Excretion can be the removal of toxic materials produced in the liver.
- 3 Excretion can be the removal of carbon dioxide from the lungs.
- 4 Excretion can be the removal of urea produced in the kidneys.

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

8 Which statement about all heroin addicts is correct?

- A Addicts depend on heroin and withdrawal symptoms can be severe.
- B Addicts take less heroin each day because the drug becomes more effective.
- C Addicts are people who have taken a lethal dose and are now dying.
- D Addicts have a lower risk of infection with viruses such as HIV.

9 Which row shows the correct information about alcohol in the body?

	effect of alcohol on reaction time	the organ that breaks down alcohol	the organ that is damaged by alcohol
A	increases	kidney	kidney
B	increases	liver	liver
C	reduces	liver	kidney
D	reduces	kidney	liver

10 Orangutans live in tropical rainforests and are herbivores.

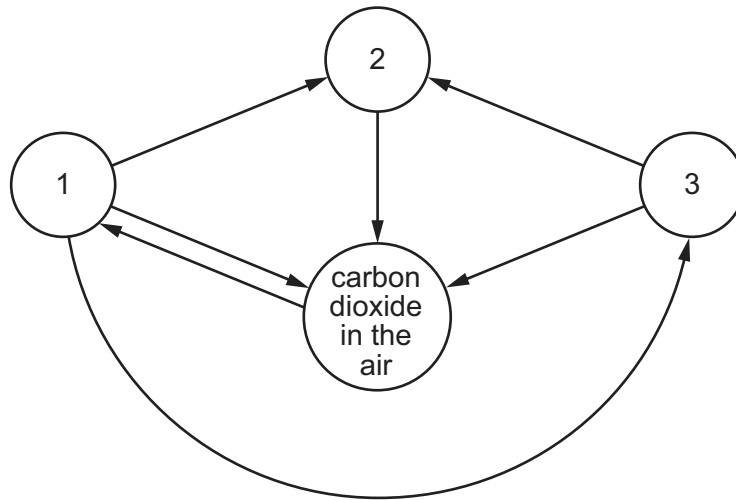
Tigers eat orangutans.

What happens to these animals if some of the rainforest is destroyed?

- A The number of orangutans decreases and the number of tigers remains the same.
- B The number of tigers decreases and the number of orangutans remains the same.
- C The numbers of both orangutans and tigers decrease.
- D The numbers of both orangutans and tigers remain the same.

11 In the diagram, arrows represent the movement of carbon compounds in the carbon cycle.

The circles represent the locations of carbon compounds in animals, decomposers, plants and in the air.



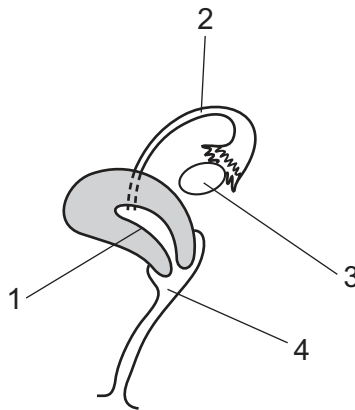
Which location of carbon compounds is represented by each circle?

	1	2	3
A	animals	plants	decomposers
B	decomposers	animals	plants
C	plants	animals	decomposers
D	plants	decomposers	animals

12 How does a plant benefit from producing brightly coloured, sweet fruits that are eaten by animals?

- A** More seeds are produced.
- B** Pollination is more likely.
- C** Seeds are dispersed more widely.
- D** Excess sugar is removed from the plant.

13 The diagram shows a side view of the female reproductive system.



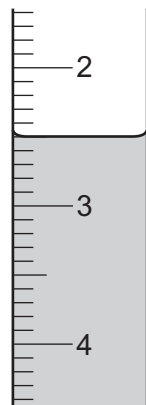
Which row shows the locations at which each of the three events normally occur?

	where implantation happens	where sperm are deposited	where zygotes are formed
A	2	1	2
B	1	4	3
C	2	1	3
D	1	4	2

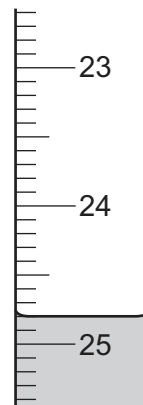
14 Hydrochloric acid is titrated with sodium hydroxide.

A hydrochloric acid solution is added to the sodium hydroxide solution from a burette.

The initial and final burette readings are shown.



initial reading



final reading

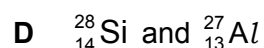
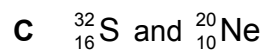
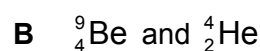
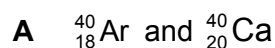
Which volume of hydrochloric acid is used in the titration?

- A** 21.70 cm³ **B** 22.30 cm³ **C** 22.80 cm³ **D** 22.90 cm³

15 Which row describes the bunching and movement of particles in a gas?

	bunching	movement
A	close together	random
B	compact	not able to move about
C	not touching each other	moving freely
D	spaced far apart	vibrate about a fixed point

16 Atoms of which two elements have the same number of neutrons?



17 P, Q, R and S are four different substances.

- P is a grey solid with a melting point of 420°C and is a good conductor of electricity.
- Q is a black solid with covalent bonding and is a good conductor of electricity.
- R is a black solid with melting point 1327°C and it only conducts electricity when melted.
- S is a ductile solid with a melting point of 1064°C and it is used in electrical connectors.

Which statement is correct?

A P and Q are both non-metals.

B P and S are both metals.

C Q and R are both metals.

D R and S are both metals.

18 Which statement describes how sodium ions are formed from sodium atoms?

A Sodium atoms gain electrons and form negative ions.

B Sodium atoms gain electrons and form positive ions.

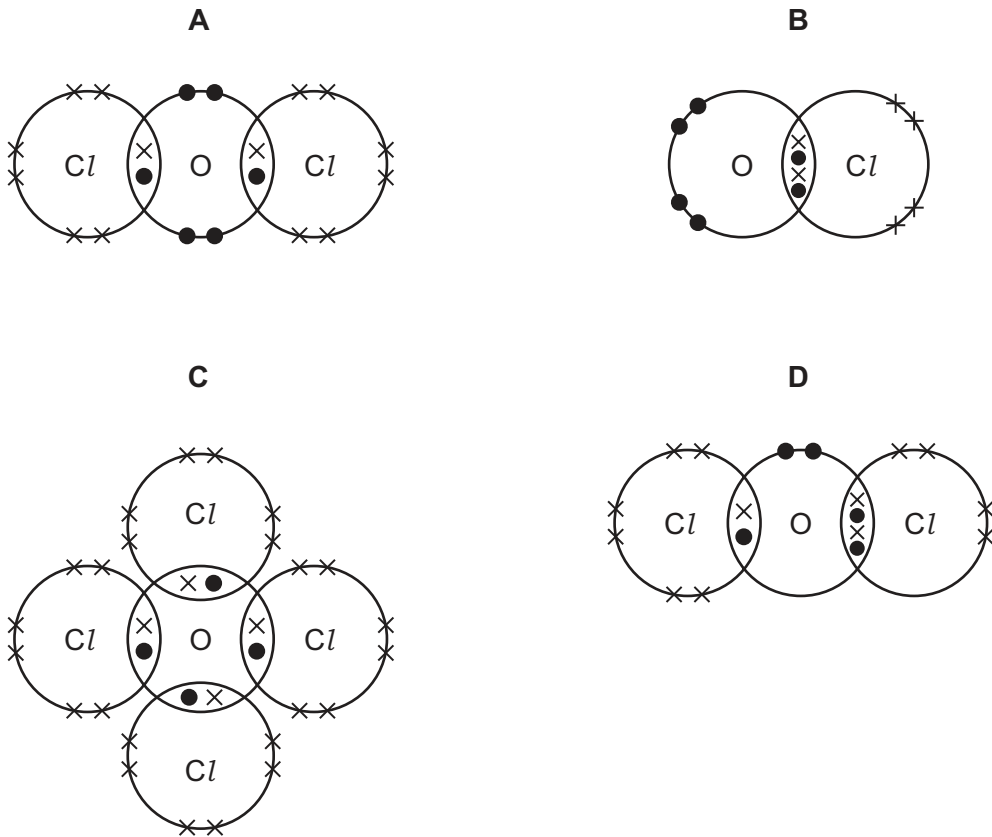
C Sodium atoms lose electrons and form negative ions.

D Sodium atoms lose electrons and form positive ions.

19 An atom of chlorine has seven outer electrons.

An atom of oxygen has six outer electrons.

Which dot-and-cross diagram for a compound formed from oxygen and chlorine is correct?



20 An ionic compound is formed when metal M combines with non-metal X.

This compound contains the ions M^{4+} and X^{3-} .

What is the formula of the compound?

- A** M_2X_3 **B** M_3X_2 **C** M_3X_4 **D** M_4X_3

21 Which statement about the properties of acids and bases is correct?

- A** All acids produce hydroxide ions in aqueous solution.
B Carbonates produce carbon dioxide in alkaline solution.
C Universal indicator paper turns green in acid solution.
D Water is one of the products when acids react with alkalis.

22 Which statement describes a trend across a period of the Periodic Table from left to right?

- A The basic character of the oxides decreases.
- B The metallic character increases.
- C The number of outer shell electrons decreases.
- D The number of protons in the nucleus decreases.

23 Which row describes a metal?

	electrical conductivity	malleability
A	no	no
B	no	yes
C	yes	no
D	yes	yes

24 Which statements about the metals are correct?

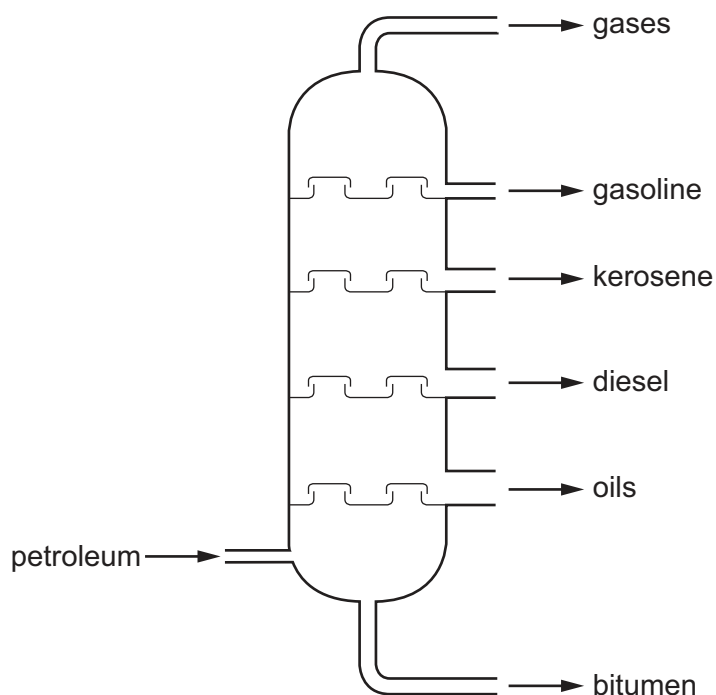
- 1 Aluminium is resistant to corrosion.
- 2 Copper reacts with hydrochloric acid to give hydrogen.
- 3 Sodium and calcium react with water to give hydrogen.
- 4 Steel is a very pure form of iron.

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

25 Which statement about the members of any homologous series is correct?

- A They have the general formula C_nH_{2n+2} .
- B They have similar chemical reactions.
- C They have the same molecular formula.
- D They have the same physical state.

26 The fractional distillation of petroleum is shown.



The gases have small molecules, the lowest boiling temperature and burn most easily.

Bitumen has large molecules, has the highest boiling temperature and burns least easily.

Which statement is correct?

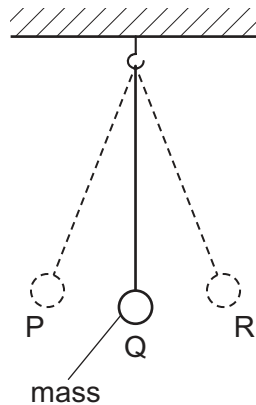
- A All of the molecules in any one fraction are the same.
- B Gasoline molecules are larger than diesel oil molecules.
- C The oils fraction burns less well than kerosene.
- D The oils fraction has a lower boiling temperature than kerosene.

27 Which formula represents an unsaturated hydrocarbon?

- A C_2H_6 B C_3H_6 C C_3H_8 D C_4H_{10}

- 28 A student measures the time period of a pendulum.

The arrangement is shown.



From its rest position at Q, the mass is pulled sideways to position P and then released.

It moves to R and back to P repeatedly.

Which statement describes how to find the period most accurately?

- A Measuring the time taken to travel from Q and back to Q.
 - B Measuring the time taken to travel from P and back to P ten times and divide by 10.
 - C Measuring the time taken to travel from P to R.
 - D Measuring the time taken to travel from P to R and doubling it.
- 29 A car of mass 1800 kg is brought to a halt. The deceleration is 2 m/s^2 .

What is the size of the force bringing the car to a halt?

- A 900 N
 - B 3600 N
 - C 18 000 N
 - D 36 000 N
- 30 A solid object is deformed by the application of a force.

What properties of the body are changed by the force?

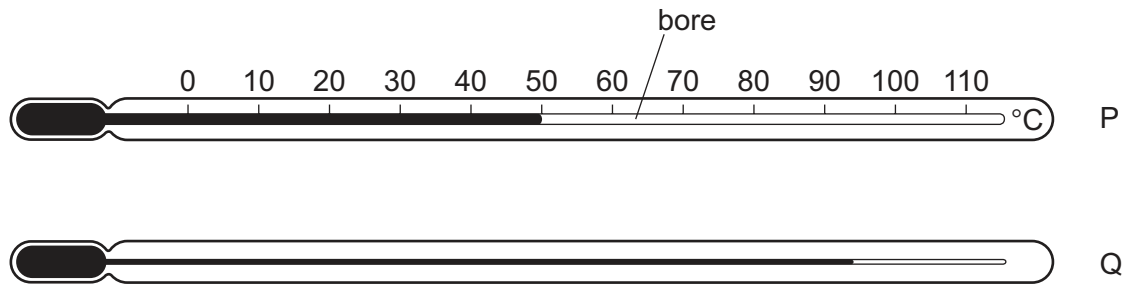
- A colour and size
 - B density and mass
 - C shape and mass
 - D shape and size
- 31 A 60 W electric lamp transfers electrical energy into heat and light energy only.

75% of the electrical energy is transferred into heat.

How much **light** energy is produced in 5.0 minutes?

- A 75 J
- B 225 J
- C 4500 J
- D 13 500 J

32 Two thermometers, P and Q, are shown. Temperature markings are only shown on P.



Both P and Q are the same length and contain the same volume of mercury.

The bore of thermometer Q is thinner.

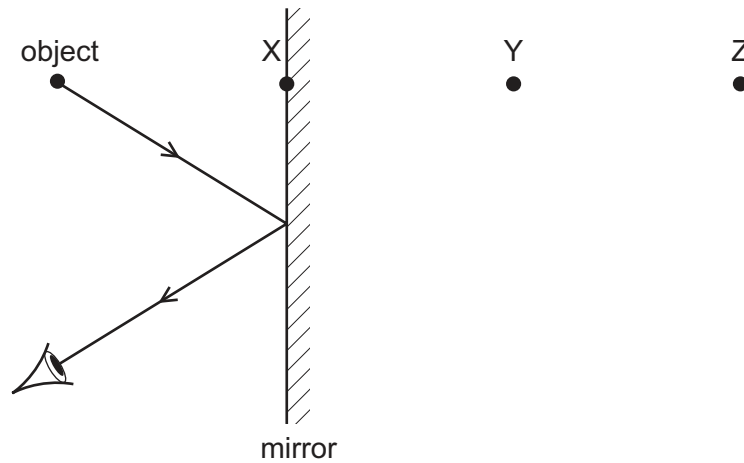
Which thermometer has the larger sensitivity and which has the larger range?

	larger sensitivity	larger range
A	P	P
B	P	Q
C	Q	P
D	Q	Q

33 Which pair of wave terms can be measured in millimetres?

- A** amplitude and wavelength
- B** frequency and speed
- C** speed and amplitude
- D** wavelength and frequency

34 The diagram shows the reflection, in a plane mirror, of a ray of light from an object.



Which statement is correct?

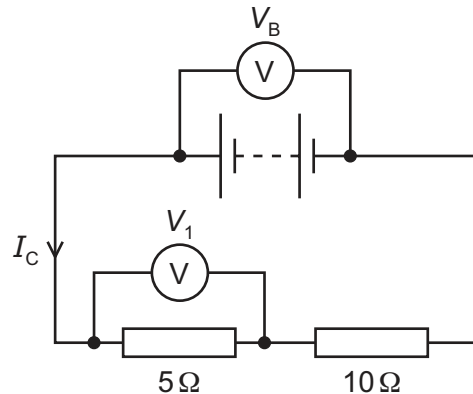
- A The image is at X.
 - B The image is between X and Y.
 - C The image is at Y.
 - D The image is between Y and Z.
- 35 A battery is connected to a lamp which glows for several minutes.

Which quantity is measured in coulombs?

- A the charge passing through the battery
- B the current in the lamp
- C the electromotive force of the battery
- D the energy supplied to the lamp

- 36 A $5\ \Omega$ resistor in series with a $10\ \Omega$ resistor is connected to a battery of e.m.f. V_B .

There is a current I_C through the $5\ \Omega$ resistor and the p.d. across it is V_1 .



What is the current through and the p.d. across the $10\ \Omega$ resistor?

	current	p.d.
A	I_C	$V_B + V_1$
B	$\frac{I_C}{2}$	$V_B - V_1$
C	$\frac{I_C}{2}$	$V_B + V_1$
D	I_C	$V_B - V_1$

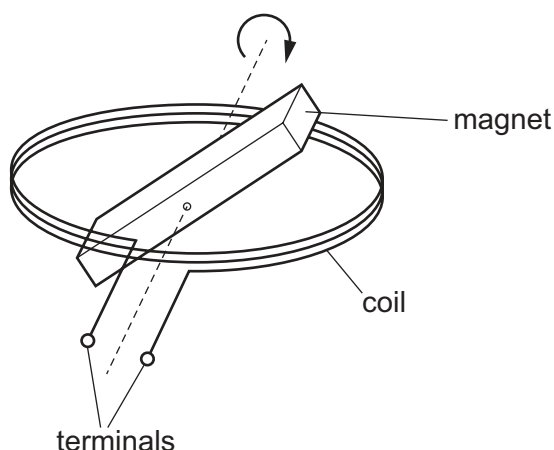
- 37 An electrician is replacing the damaged plugs attached to a microwave oven in a metal case and a radio in a plastic case.

There are three wires to connect in the plug for the microwave and only two in the plug for the radio.

Which statement explains this?

- A** The microwave oven has a metal case that needs to be earthed.
- B** The microwave oven is more powerful so needs an extra wire to supply enough current.
- C** The radio is less powerful so it does not need a live wire to be connected.
- D** The radio only needs a live wire and an earth wire to be connected.
- 38 Which statement describes an object that must be magnetised?
- A** one that attracts a positive charge
- B** one that attracts both ends of a permanent magnet
- C** one that conducts electricity
- D** one that repels one end of a permanent magnet

39 A simple a.c. generator consists of a magnet rotating in a coil.



Which change increases the size of the voltage output?

- A increasing the distance between the terminals
 - B increasing the speed of rotation
 - C using a coil of fewer turns
 - D using a weaker magnet
- 40 The decay equation shows a nuclide X emitting an alpha-particle and gamma-radiation to form a nuclide Y.



Which row gives the correct nucleon and proton numbers for nuclide Y?

	nucleon number	proton number
A	210	82
B	212	80
C	213	83
D	214	85

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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	1 H hydrogen 1	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	<p>Key</p> <p>atomic number</p> <p>atomic symbol</p> <p>name</p> <p>relative atomic mass</p>															
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 —	118 Og oganeson —	119 Uue unbinilium —	120 Uub unbinilium —	121 Uut ununilium —

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 —

lanthanoids

actinoids

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).