



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.

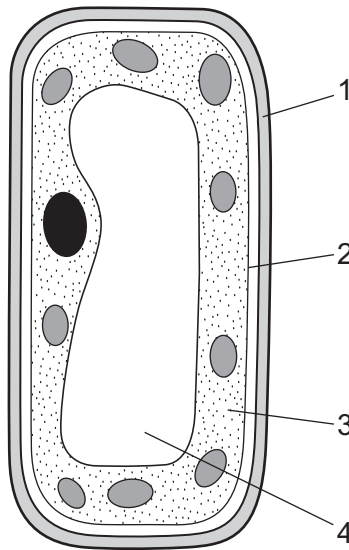
INFORMATION

- 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.

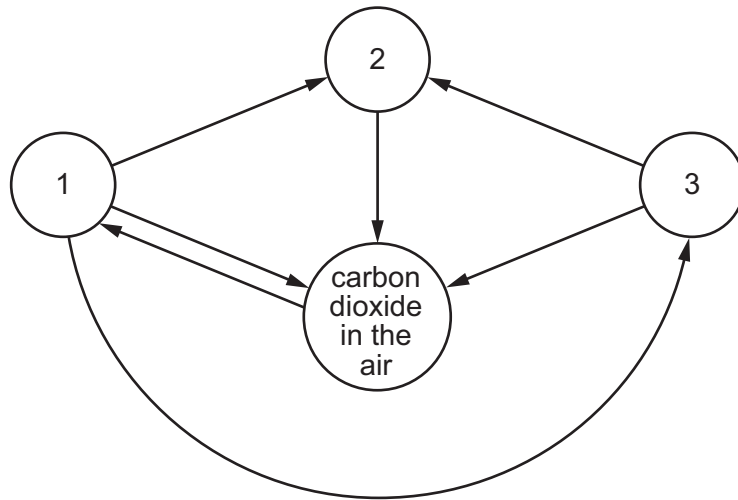
Tigers eat orangutans.

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.



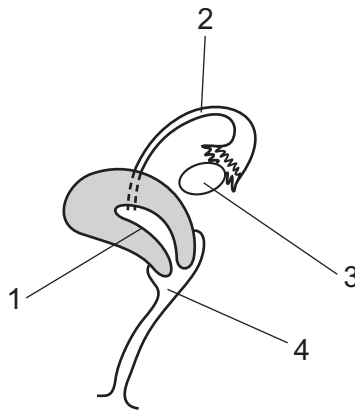
Which location of carbon compounds is represented by each circle?

	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.



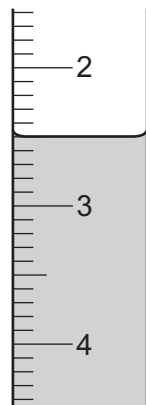
Which row shows the locations at which each of the three events normally occur?

	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

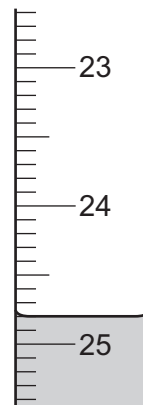
14 Hydrochloric acid is titrated with sodium hydroxide.

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

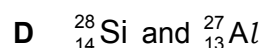
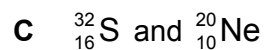
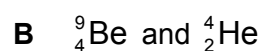
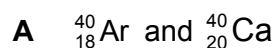
Which volume of hydrochloric acid is used in the titration?

- 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.

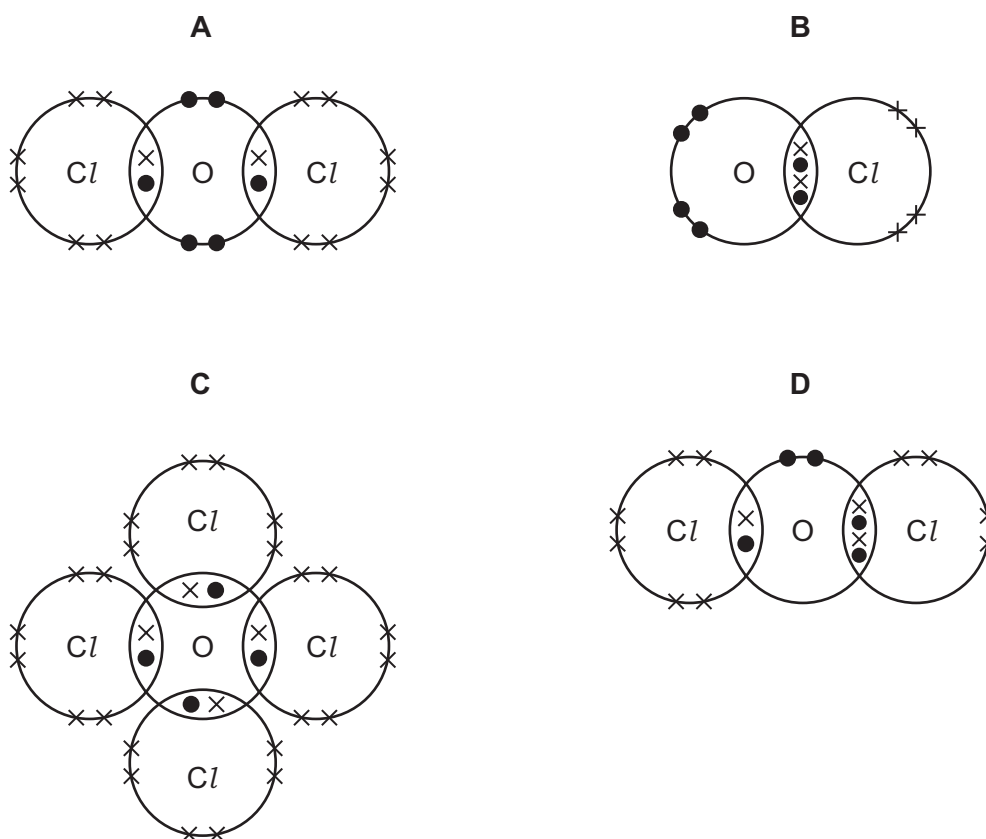
C Sodium atoms lose electrons and form negative ions.

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?

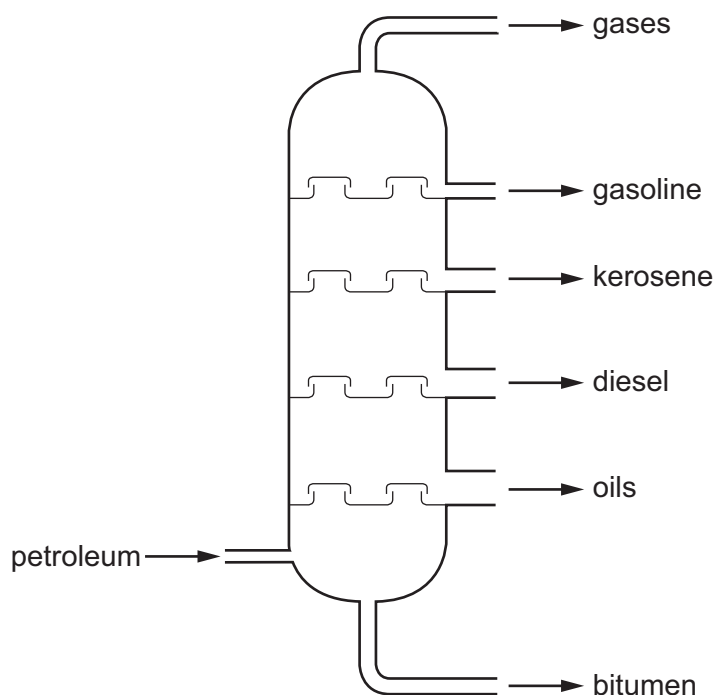
- 1 Aluminium is resistant to corrosion.
- 2 Copper reacts with hydrochloric acid to give hydrogen.
- 3 Sodium and calcium react with water to give hydrogen.
- 4 Steel is a very pure form of iron.

- 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?

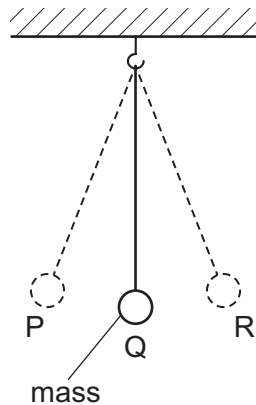
- A All of the molecules in any one fraction are the same.
- B Gasoline molecules are larger than diesel oil molecules.
- C The oils fraction burns less well than kerosene.
- D The oils fraction has a lower boiling temperature than kerosene.

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 .

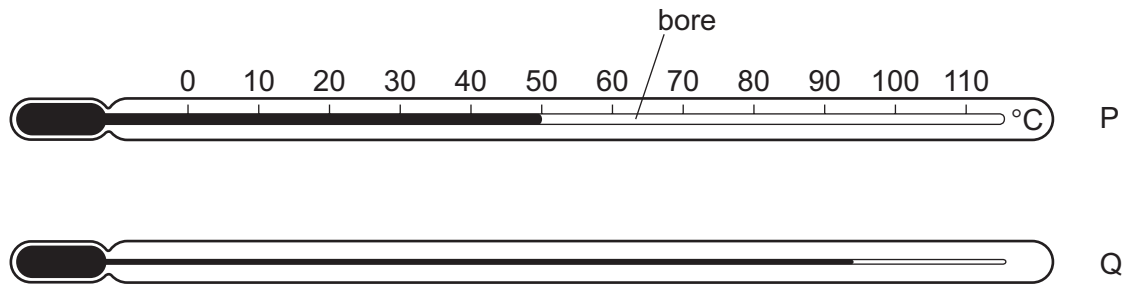
What is the size of the force bringing the car to a halt?

- 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.

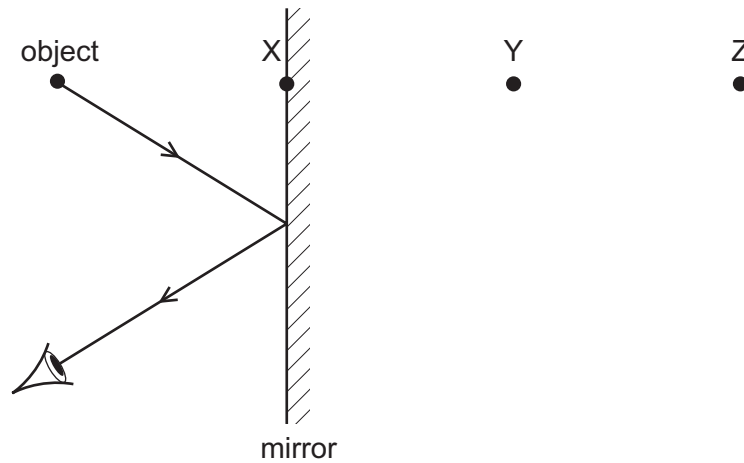
Which thermometer has the larger sensitivity and which has the larger range?

	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?

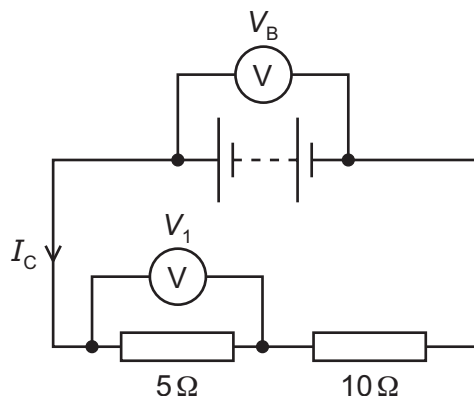
- A The image is at X.
 - B The image is between X and Y.
 - C The image is at Y.
 - D The image is between Y and Z.
- 35 A battery is connected to a lamp which glows for several minutes.

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	$V_B - V_1$

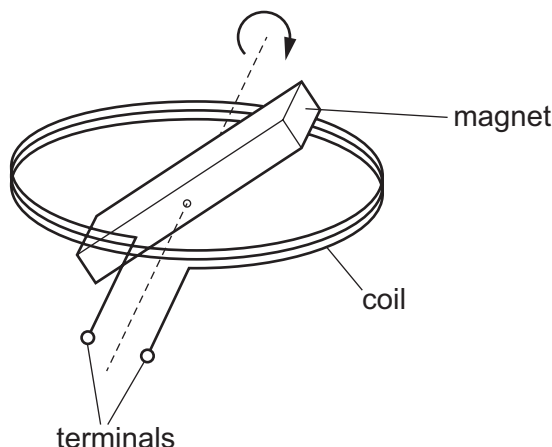
- 37 An electrician is replacing the damaged plugs attached to a microwave oven in a metal case and a radio in a plastic case.

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	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 Ac actinium —	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 —	119 Uue unbinilium —	120 Uub unbinilium —	121 Uut ununilium —	122 Uuq ununilium —	123 Uuq ununilium —	124 Uuq ununilium —	125 Uuq ununilium —	126 Uuq ununilium —	127 Uuq ununilium —	128 Uuq ununilium —	129 Uuq ununilium —	130 Uuq ununilium —	131 Uuq ununilium —	132 Uuq ununilium —	133 Uuq ununilium —	134 Uuq ununilium —	135 Uuq ununilium —	136 Uuq ununilium —	137 Uuq ununilium —	138 Uuq ununilium —	139 Uuq ununilium —	140 Uuq ununilium —	141 Uuq ununilium —	142 Uuq ununilium —	143 Uuq ununilium —	144 Uuq ununilium —	145 Uuq ununilium —	146 Uuq ununilium —	147 Uuq ununilium —	148 Uuq ununilium —	149 Uuq ununilium —	150 Uuq ununilium —	151 Uuq ununilium —	152 Uuq ununilium —	153 Uuq ununilium —	154 Uuq ununilium —	155 Uuq ununilium —	156 Uuq ununilium —	157 Uuq ununilium —	158 Uuq ununilium —	159 Uuq ununilium —	160 Uuq ununilium —	161 Uuq ununilium —	162 Uuq ununilium —	163 Uuq ununilium —	164 Uuq ununilium —	165 Uuq ununilium —	166 Uuq ununilium —	167 Uuq ununilium —	168 Uuq ununilium —	169 Uuq ununilium —	170 Uuq ununilium —	171 Uuq ununilium —	172 Uuq ununilium —	173 Uuq ununilium —	174 Uuq ununilium —	175 Uuq ununilium —	176 Uuq ununilium —	177 Uuq ununilium —	178 Uuq ununilium —	179 Uuq ununilium —	180 Uuq ununilium —	181 Uuq ununilium —	182 Uuq ununilium —	183 Uuq ununilium —	184 Uuq ununilium —	185 Uuq ununilium —	186 Uuq ununilium —	187 Uuq ununilium —	188 Uuq ununilium —	189 Uuq ununilium —	190 Uuq ununilium —	191 Uuq ununilium —	192 Uuq ununilium —	193 Uuq ununilium —	194 Uuq ununilium —	195 Uuq ununilium —	196 Uuq ununilium —	197 Uuq ununilium —	198 Uuq ununilium —	199 Uuq ununilium —	200 Uuq ununilium —	201 Uuq ununilium —	202 Uuq ununilium —	203 Uuq ununilium —	204 Uuq ununilium —	205 Uuq ununilium —	206 Uuq ununilium —	207 Uuq ununilium —	208 Uuq ununilium —	209 Uuq ununilium —	210 Uuq ununilium —	211 Uuq ununilium —	212 Uuq ununilium —	213 Uuq ununilium —	214 Uuq ununilium —	215 Uuq ununilium —	216 Uuq ununilium —	217 Uuq ununilium —	218 Uuq ununilium —	219 Uuq ununilium —	220 Uuq ununilium —	221 Uuq ununilium —	222 Uuq ununilium —	223 Uuq ununilium —	224 Uuq ununilium —	225 Uuq ununilium —	226 Uuq ununilium —	227 Uuq ununilium —	228 Uuq ununilium —	229 Uuq ununilium —	230 Uuq ununilium —	231 Uuq ununilium —	232 Uuq ununilium —	233 Uuq ununilium —	234 Uuq ununilium —	235 Uuq ununilium —	236 Uuq ununilium —	237 Uuq ununilium —	238 Uuq ununilium —	239 Uuq ununilium —	240 Uuq ununilium —	241 Uuq ununilium —	242 Uuq ununilium —	243 Uuq ununilium —	244 Uuq ununilium —	245 Uuq ununilium —	246 Uuq ununilium —	247 Uuq ununilium —	248 Uuq ununilium —	249 Uuq ununilium —	250 Uuq ununilium —	251 Uuq ununilium —	252 Uuq ununilium —	253 Uuq ununilium —	254 Uuq ununilium —	255 Uuq ununilium —	256 Uuq ununilium —	257 Uuq ununilium —	258 Uuq ununilium —	259 Uuq ununilium —	260 Uuq ununilium —	261 Uuq ununilium —	262 Uuq ununilium —	263 Uuq ununilium —	264 Uuq ununilium —	265 Uuq ununilium —	266 Uuq ununilium —	267 Uuq ununilium —	268 Uuq ununilium —	269 Uuq ununilium —	270 Uuq ununilium —	271 Uuq ununilium —	272 Uuq ununilium —	273 Uuq ununilium —	274 Uuq ununilium —	275 Uuq ununilium —	276 Uuq ununilium —	277 Uuq ununilium —	278 Uuq ununilium —	279 Uuq ununilium —	280 Uuq ununilium —	281 Uuq ununilium —	282 Uuq ununilium —	283 Uuq ununilium —	284 Uuq ununilium —	285 Uuq ununilium —	286 Uuq ununilium —	287 Uuq ununilium —	288 Uuq ununilium —	289 Uuq ununilium —	290 Uuq ununilium —	291 Uuq ununilium —	292 Uuq ununilium —	293 Uuq ununilium —	294 Uuq ununilium —	295 Uuq ununilium —	296 Uuq ununilium —	297 Uuq ununilium —	298 Uuq ununilium —	299 Uuq ununilium —	300 Uuq ununilium —

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.).