



Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/12

Paper 1 Multiple Choice (Core)

October/November 2019

45 minutes

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

* 6 5 2 4 5 1 6 9 0 5 *

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 **14** printed pages and **2** blank pages.

1 Which term is used to describe the removal of toxic materials from living organisms?

- A excretion
- B nutrition
- C respiration
- D secretion

2 Which row describes diffusion?

	direction of net movement	type of movement
A	higher concentration to lower concentration	non-random
B	higher concentration to lower concentration	random
C	lower concentration to higher concentration	non-random
D	lower concentration to higher concentration	random

3 Which result with the biuret test shows that protein is present?

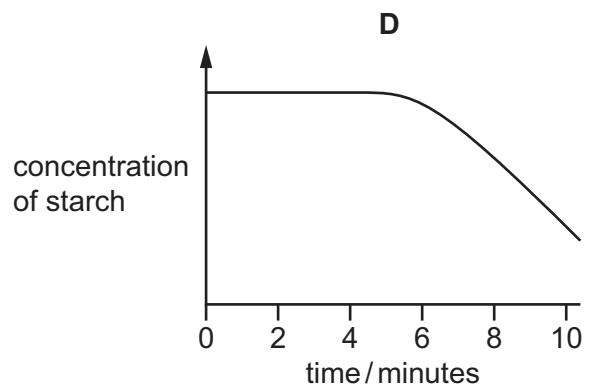
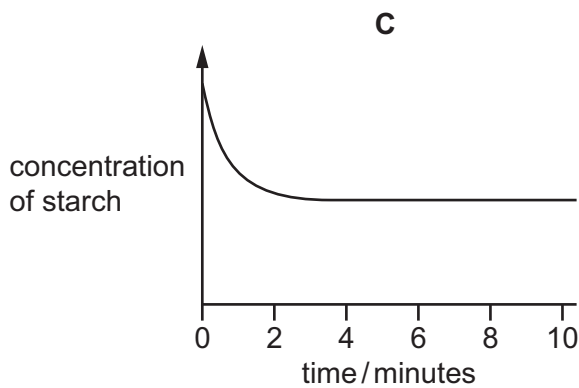
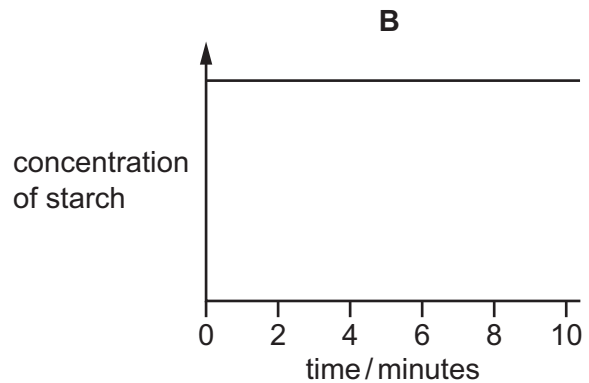
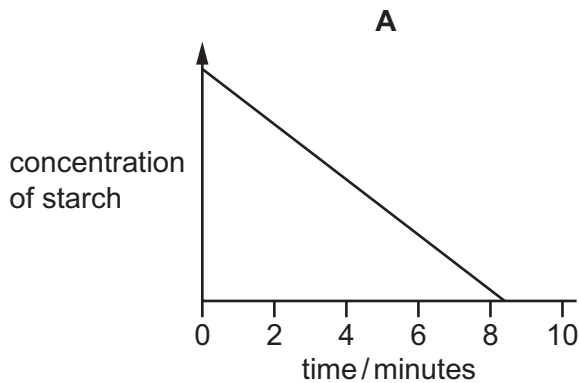
- A blue
- B green
- C orange
- D purple

3

4 A solution of salivary amylase is boiled in a test tube.

The boiled amylase is then added to a solution of starch.

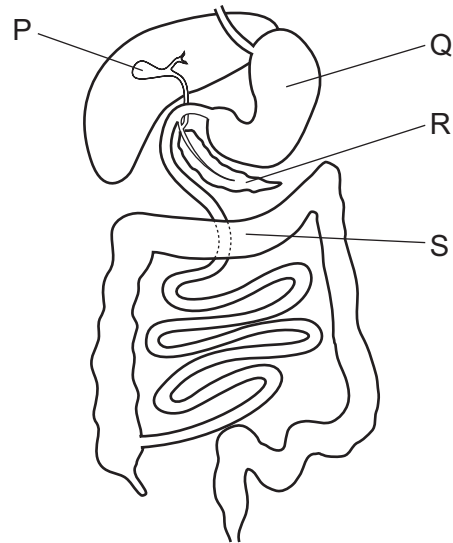
Which graph shows what happens to the concentration of starch in the mixture during the next 10 minutes?



5 What is the word equation for photosynthesis?

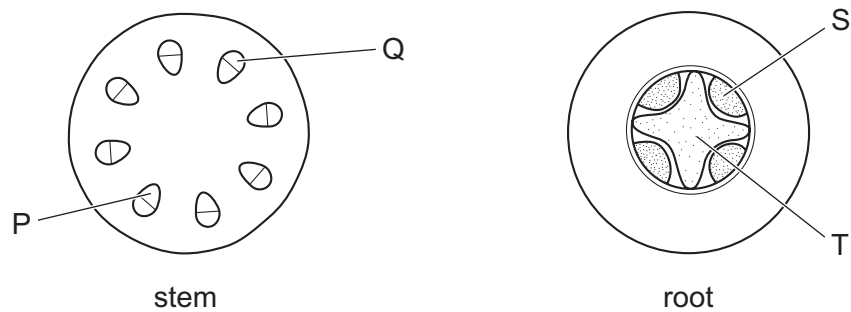
- A** carbon dioxide + glucose \rightarrow oxygen + water
- B** carbon dioxide + water \rightarrow oxygen + glucose
- C** oxygen + glucose \rightarrow carbon dioxide + water
- D** oxygen + water \rightarrow carbon dioxide + glucose

- 6 The diagram shows some parts of the alimentary canal and its associated organs.



Which organs produce digestive enzymes?

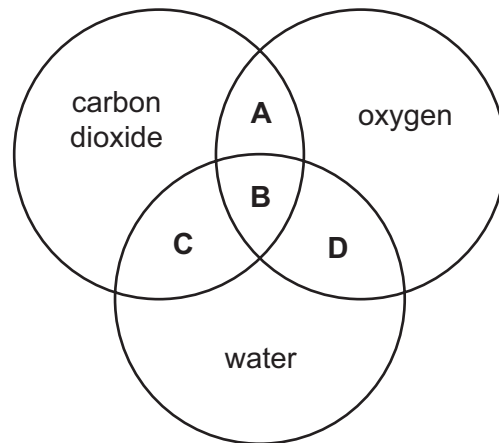
- A** P and Q **B** Q and R **C** R and S **D** S and P
- 7 The diagrams show sections through a stem and a root.



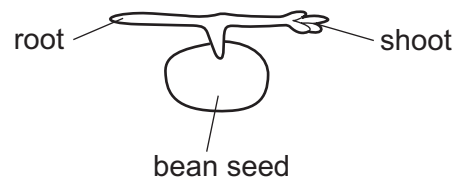
Which indicate the positions of the xylem?

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

- 8 Which area represents the substances produced in aerobic respiration?



- 9 A growing seedling was held in position as shown in the diagram.



It was then placed in the dark for 3 days.

Which diagram shows the shape of the root and the shoot of the same seedling after the 3 days?



- 10 Sexual reproduction involves the fusion of cells.

Which row shows the types of cells involved and what the fusion produces?

	type of cell	product of fusion
A	gametes	genetically different zygote
B	gametes	genetically identical zygote
C	zygotes	genetically different gamete
D	zygotes	genetically identical gamete

11 Which statement about human gametes is correct?

- A Only 50% of egg cells contain an X chromosome.
- B Only 50% of sperm cells contain a Y chromosome.
- C 100% of egg cells contain a Y chromosome.
- D 100% of sperm cells contain an X chromosome.

12 Which statement about how organisms get their energy is **not** correct?

	organism	source of energy
A	carnivores	animals
B	decomposers	dead plants
C	green plants	minerals
D	herbivores	plants

13 What changes in combustion and deforestation increase carbon dioxide in the atmosphere?

- A decreased combustion, decreased deforestation
- B decreased combustion, increased deforestation
- C increased combustion, decreased deforestation
- D increased combustion, increased deforestation

14 How is copper sulfate separated from aqueous copper sulfate?

- A chromatography
- B crystallisation
- C filtration
- D fractional distillation

15 Which processes are chemical changes?

- 1 conversion of steam to liquid water
- 2 cracking of alkanes
- 3 fractional distillation of petroleum
- 4 thermal decomposition of calcium carbonate

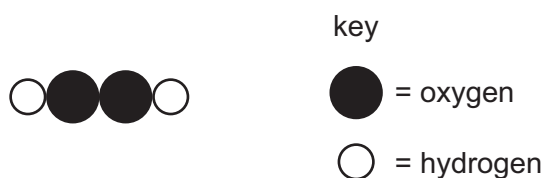
- A 1 and 3 B 1 and 4 C 2 and 3 D 2 and 4

16 In which molecule are **all** the outer electrons of the atoms used in covalent bonds?

- A** CH₄ **B** HCl **C** H₂O **D** NH₃

17 Hydrogen peroxide is a compound.

A molecule of hydrogen peroxide can be represented as shown.



What is the formula of hydrogen peroxide?

- A** HO **B** H₂O₂ **C** (OH)₂ **D** 2OH

18 The table shows the temperature of some water before and after a solid is dissolved in it.

Which change is the most exothermic?

	temperature before /°C	temperature after /°C
A	20	18
B	20	40
C	25	18
D	25	42

19 Which statement explains why the rusting of iron is an oxidation reaction?

- A** Iron gains oxygen.
- B** Iron is a transition metal.
- C** Iron is very reactive.
- D** Iron loses oxygen.

20 An acid neutralises solution X.

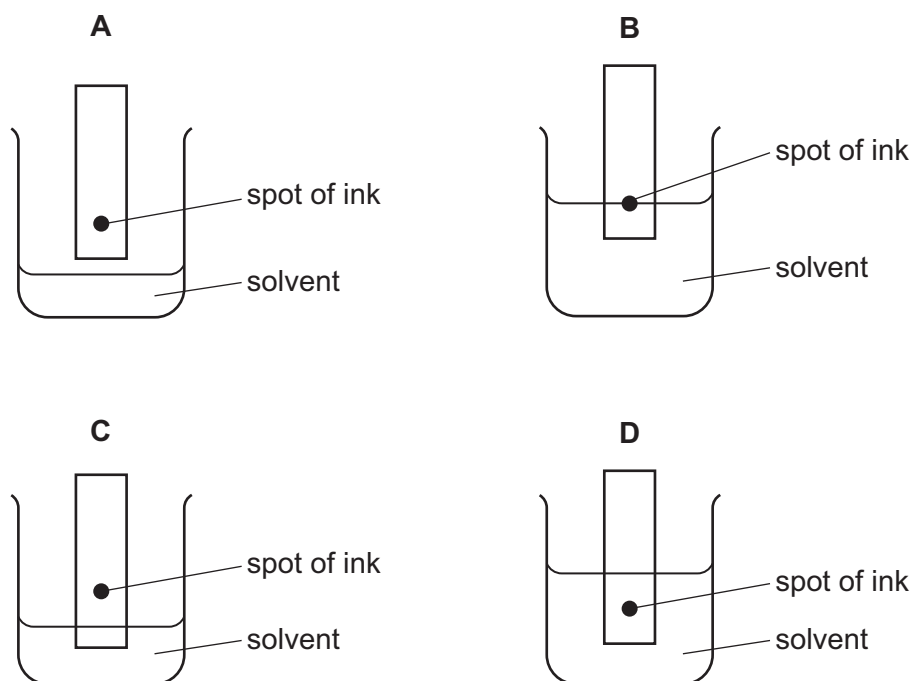
A neutral solution is formed.

What are the pH values of solution X and of the neutral solution?

	pH of solution X	pH of neutral solution
A	2	7
B	2	12
C	12	2
D	12	7

21 The colours in an ink can be separated by chromatography.

Which diagram shows the correct way to set up the apparatus?



22 Which statement about the Periodic Table is correct?

- A** Elements are listed in order of neutron number.
- B** Elements are listed in order of nucleon number.
- C** Elements are listed in order of proton number.
- D** Elements are listed in order of relative atomic mass.

23 Zinc is mixed with molten element X.

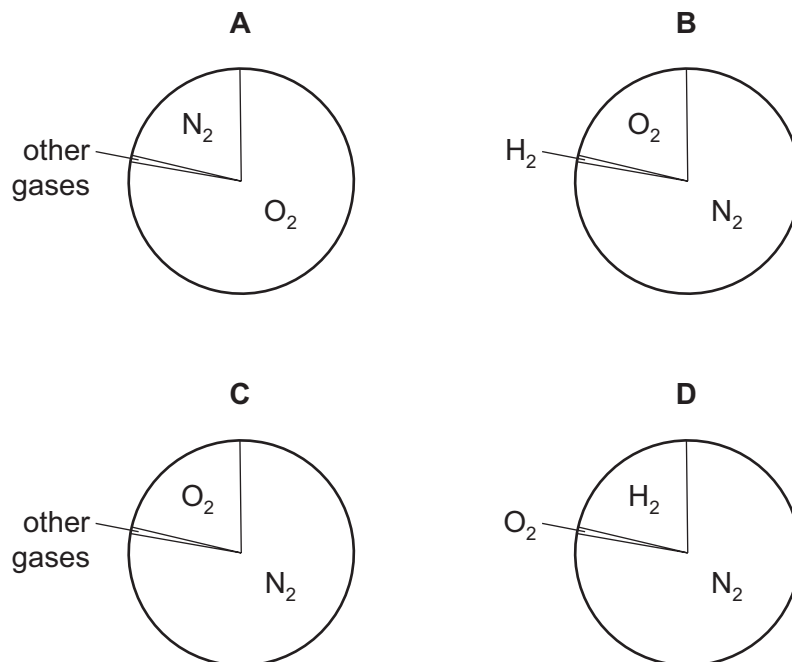
A new material, Y, is made.

Y conducts electricity.

Which type of substance is Y?

- A alloy
- B covalent compound
- C macromolecule
- D ionic compound

24 Which pie chart represents the composition of clean air?

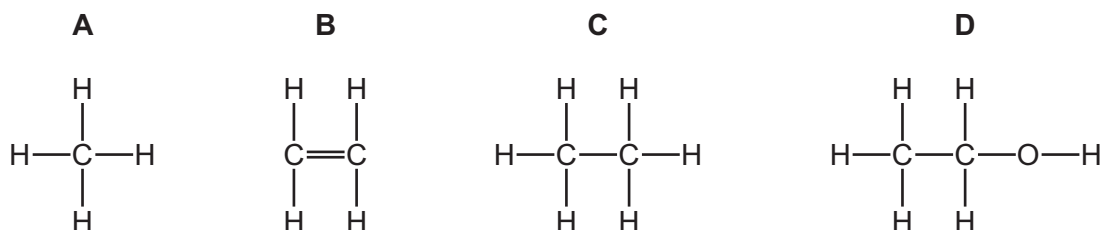


25 Which substances neutralise acids?

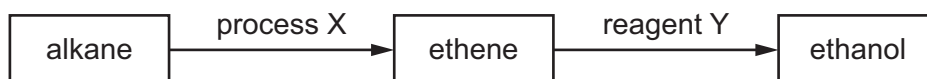
- 1 lime
- 2 limestone
- 3 calcium hydroxide

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

26 Which diagram represents a molecule of ethane?



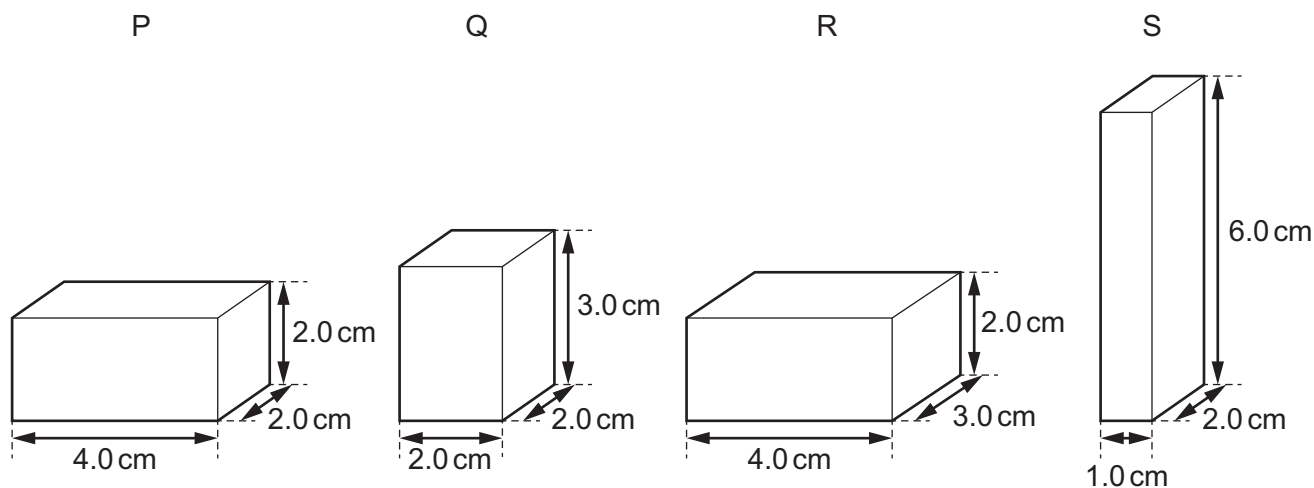
27 The flow diagram shows the manufacture of ethanol from alkanes.



What are process X and reagent Y?

	process X	reagent Y
A	cracking	hydrogen
B	cracking	steam
C	fractional distillation	hydrogen
D	fractional distillation	steam

28 Four solid cuboid blocks P, Q, R and S have the dimensions shown in the diagram and masses that are equal.



Which two blocks have the same density?

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

29 What **cannot** be changed by a force acting on a body?

- A the mass of the body
- B the motion of the body
- C the shape of the body
- D the size of the body

30 Four cars travel up the same hill. They have different masses and take different times to travel up the hill.

Which car is supplying the most useful power?

	mass of car / kg	time taken to travel up hill / s
A	1500	10
B	1500	20
C	3000	10
D	3000	20

31 A ball is dropped from rest and falls.

Which row describes the kinetic energy and the gravitational potential energy of the ball immediately after it is released?

	kinetic energy	gravitational potential energy
A	decreasing	decreasing
B	decreasing	increasing
C	increasing	decreasing
D	increasing	increasing

32 A substance is a gas when its temperature is 65 °C.

How do the boiling point and the melting point of this substance compare with 65 °C?

	boiling point	melting point
A	above 65 °C	above 65 °C
B	above 65 °C	below 65 °C
C	below 65 °C	above 65 °C
D	below 65 °C	below 65 °C

33 A room is heated using an electric heater placed on the floor.

What is the name of the process by which the heated air moves around the room?

- A conduction
- B convection
- C evaporation
- D radiation

34 A student looks at her image in a vertical plane mirror.

Which row describes the size of the image and its position?

	size	position
A	magnified	behind mirror
B	magnified	on surface of mirror
C	same as student	behind mirror
D	same as student	on surface of mirror

35 Which row gives the properties of a sound wave that affect the pitch and the loudness of a sound?

	pitch	loudness
A	amplitude	amplitude
B	amplitude	frequency
C	frequency	amplitude
D	frequency	frequency

36 There is a current of 4.0 A in a resistor and a potential difference (p.d.) of 12 V across it.

What is the resistance of the resistor?

- A $0.33\ \Omega$ B $3.0\ \Omega$ C $8.0\ \Omega$ D $48\ \Omega$

37 A $1.0\ \Omega$ resistor, a $3.0\ \Omega$ resistor, and a $6.0\ \Omega$ resistor are connected in series.

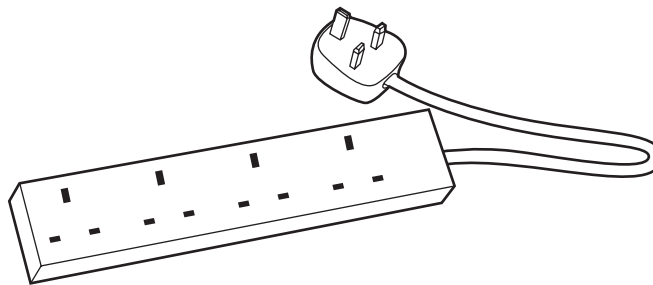
What is the combined resistance of this combination?

- A $4.0\ \Omega$ B $7.0\ \Omega$ C $10\ \Omega$ D $18\ \Omega$

- 38 Which row shows how lamps are connected in a lighting circuit in a house and gives an advantage of connecting them in this way?

	how lamps are connected	advantage of connecting them in this way
A	in parallel	they can be switched separately
B	in parallel	they share the voltage
C	in series	they can be switched separately
D	in series	they share the voltage

- 39 An electrical extension block has four sockets, a cable which can safely take a current of 6 A and a plug. It is protected by a fuse rated at 5 A.



The extension block is used with four appliances and the 5 A fuse blows. The owner replaces the 5 A fuse with a 13 A fuse.

Why is the extension block now dangerous?

- A** The appliances may overheat before the fuse blows.
 - B** The cable may overheat before the fuse blows.
 - C** The sockets may burn out before the fuse blows.
 - D** The 13 A fuse may blow too soon.
- 40 Which type of radiation has the greatest ionising effect, and which is the most penetrating?

	greatest ionising effect	most penetrating
A	α -particles	α -particles
B	α -particles	γ -rays
C	γ -rays	α -particles
D	γ -rays	γ -rays

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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	Key atomic number atomic symbol name relative atomic mass		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 —	114 Fl flerovium —	116 Lv livermorium —	116 Lv livermorium —	116 Lv livermorium —	116 Lv livermorium —	116 Lv livermorium —	116 Lv livermorium —	116 Lv livermorium —

lanthanoids

actinoids

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 —

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