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Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/12**

Paper 1 Multiple Choice (Core) **October/November 2022**

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.

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1 What are characteristics of all living organisms?

A breathing, excretion, nutrition

B excretion, growth, nutrition

C reproduction, respiration, germination

D secretion, growth, sensitivity

2 Which features are found in both animal and plant cells?

	cell membrane	cell wall	chloroplast	cytoplasm
A	✗	✓	✗	✓
B	✓	✗	✓	✗
C	✗	✓	✓	✗
D	✓	✗	✗	✓

3 Food tests are carried out on a biscuit.

The results of the food tests are shown.

test for	colour observed
fat	white emulsion
protein	blue
reducing sugar	orange
starch	blue-black

Which biological molecules are present in the biscuit?

	fat	protein	reducing sugar	starch
A	✓	✗	✗	✗
B	✓	✗	✓	✓
C	✗	✓	✓	✓
D	✗	✓	✗	✗

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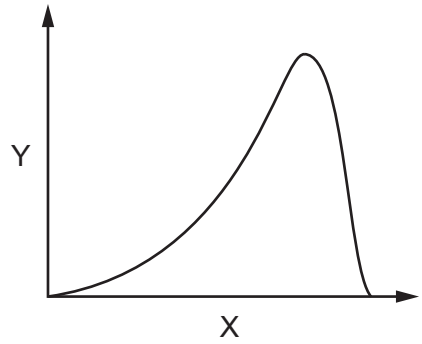
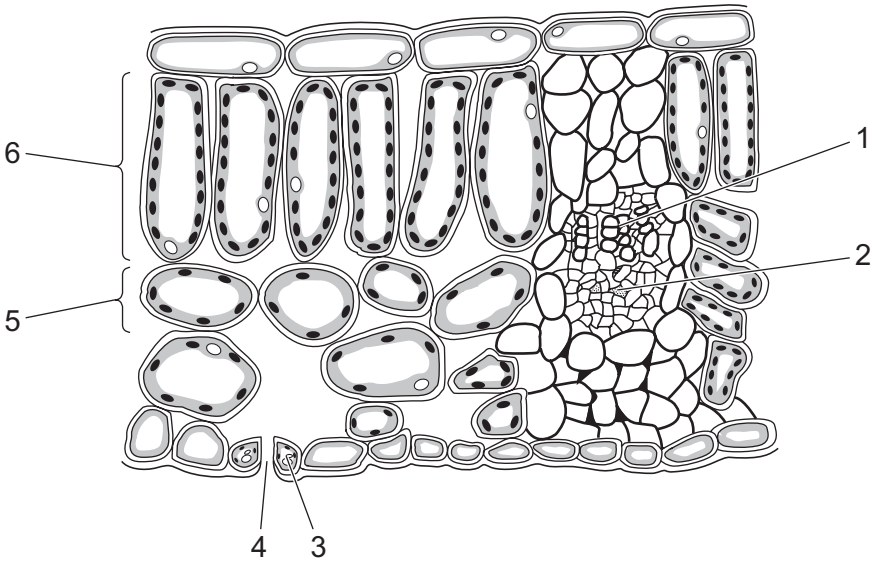
4 The graph shows the effect of one variable on amylase activity.



What are the labels X and Y?

	X	Y
A	amylase activity	pH
B	amylase activity	temperature
C	pH	amylase activity
D	temperature	amylase activity

5 The diagram shows a section through the leaf of a dicotyledonous plant.



Which numbered labels identify the named structures in this leaf?

	guard cell	phloem	spongy mesophyll
A	4	1	5
B	3	1	6
C	4	2	6
D	3	2	5

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6 Which statements about dietary fibre are correct?

1 It is digested in the stomach.

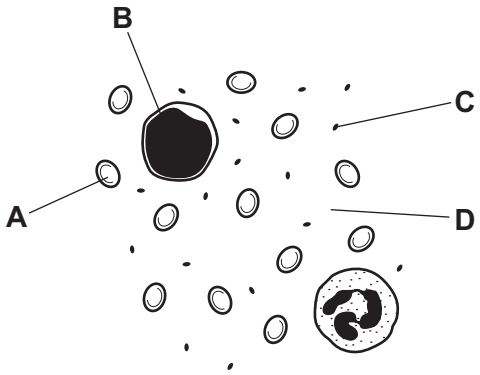
2 It is ingested in the mouth.

3 It is not absorbed in the small intestine.

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

7 The diagram shows components of blood as seen with a light microscope.

Which component produces antibodies?



8 What is the word equation for aerobic respiration?

A carbon dioxide + chlorophyll → glucose + oxygen

B carbon dioxide + glucose → oxygen + water

C glucose + oxygen → carbon dioxide + water

D oxygen + light energy → carbon dioxide + water

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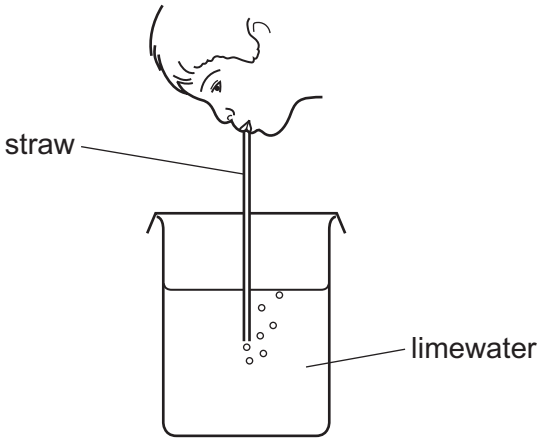
9 A student tests her exhaled breath by blowing through a straw into some limewater.



Which statements are correct about this test?

	colour of limewater at **start** of test	colour of limewater at **end** of test	what the test shows
A	colourless	milky white	carbon dioxide is present in the exhaled breath
B	colourless	milky white	water vapour is present in the exhaled breath
C	milky white	colourless	carbon dioxide is present in the exhaled breath
D	milky white	colourless	water vapour is present in the exhaled breath

10 Some examples of responses in the body are listed.

1 increased breathing rate

2 increased digestion rate

3 increased pulse rate

4 widened pupils

Which responses are caused by the hormone adrenaline?

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

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11 What are two features of sexual reproduction?

	feature 1	feature 2
A	fusion of two identical nuclei	requires two different parents
B	fusion of two zygotes	offspring are genetically identical
C	offspring are genetically different	fusion of two different nuclei
D	only requires a single parent	development from a single zygote

12 Where are male gametes made in a flower?

A anther

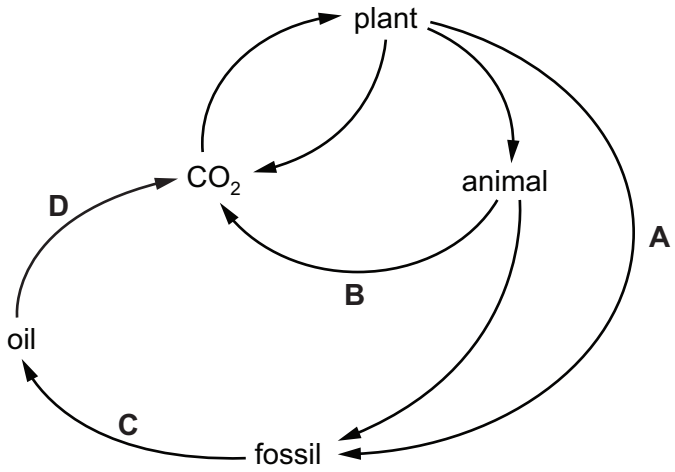
B filament

C stigma

D style

13 The diagram shows part of the carbon cycle.

Which letter represents combustion?



14 An atom of aluminium and an atom of fluorine are represented as shown.

$$^{27}_{13}Al \qquad ^{19}_{9}F$$

Which statement is **not** correct?

A The aluminium atom contains four more electrons than the fluorine atom.

B The aluminium atom contains four more protons than the fluorine atom.

C The aluminium atom contains eight more neutrons than the fluorine atom.

D The aluminium atom contains eight more nucleons than the fluorine atom.

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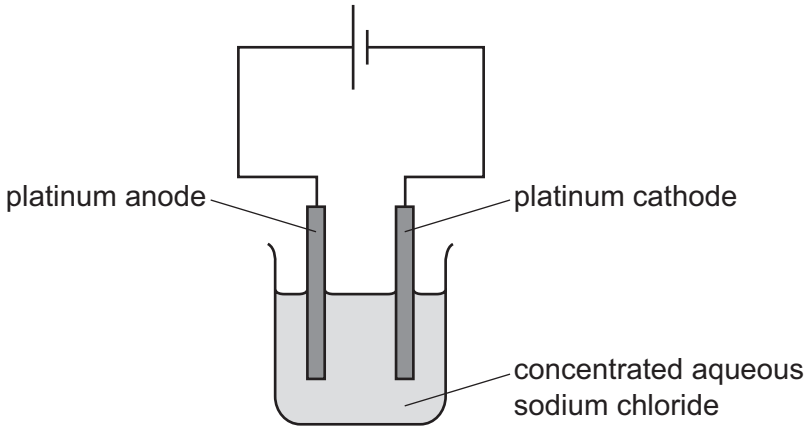
15 In boron chloride, 25% of the atoms are boron.

What is the formula of boron chloride?

A BCl **B** BCl_3 **C** B_2Cl_3 **D** B_3Cl

16 The apparatus used for the electrolysis of concentrated aqueous sodium chloride is shown.



What is the product at the cathode?

A chlorine

B hydrogen

C oxygen

D sodium

17 The initial and final temperature of four different reaction mixtures are measured.

Which row identifies the most exothermic reaction?

	initial temperature / °C	final temperature / °C
A	20	25
B	21	17
C	22	12
D	23	26

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18 10 g of solid calcium carbonate is added to 100 cm^3 of hydrochloric acid.

Which row shows the conditions that produce the highest rate of reaction?

	concentration of hydrochloric acid	calcium carbonate
A	high	lumps
B	high	powder
C	low	lumps
D	low	powder

19 Iron oxide reacts with carbon monoxide.

The word equation for the reaction is shown.

iron oxide + carbon monoxide → iron + carbon dioxide

Which statement about this reaction is **not** correct?

A Carbon monoxide is reduced.

B Carbon monoxide is oxidised.

C Iron oxide is reduced.

D It is a redox reaction.

20 The word equation represents the reaction between substance J and hydrochloric acid.

substance J + hydrochloric acid → magnesium chloride + hydrogen

What is substance J?

A magnesium

B magnesium carbonate

C magnesium hydroxide

D magnesium oxide

21 Which pair of gases can be identified using damp litmus paper and limewater?

A carbon dioxide and hydrogen

B chlorine and carbon dioxide

C chlorine and oxygen

D hydrogen and chlorine

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22 Element X has a high density and conducts electricity when solid and when molten.

Where in the Periodic Table is element X placed?

A Group 0

B Group I

C halogens

D transition elements

23 The noble gases are in Group VIII of the Periodic Table.

Which statement is correct?

A Argon exists as non-bonded atoms.

B Krypton is very reactive.

C Neon burns in pure oxygen with a red flame.

D The chemical formula of helium is He_2.

24 Which row identifies the methods used to extract copper and aluminium from their ores?

	copper	aluminium
A	electrolysis	electrolysis
B	electrolysis	heating with carbon
C	heating with carbon	electrolysis
D	heating with carbon	heating with carbon

25 A few drops of liquid X are added to a white solid.

The white solid turns blue.

Which statements are correct?

1 The white solid is copper(II) sulfate.

2 Liquid X is water.

3 Liquid X turns blue cobalt(II) chloride paper pink.

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

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26 Which statements about the fractions obtained by fractional distillation of petroleum are correct?

1 Gas oil is used as a fuel in petrol engines.

2 Naphtha is used for road surfaces.

3 Refinery gas is used as bottled gas for heating.

4 The fractions are mixtures of hydrocarbons.

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

27 The formula of the hydrocarbon octane is C_8H_{18}.

What are the products of the complete combustion of octane?

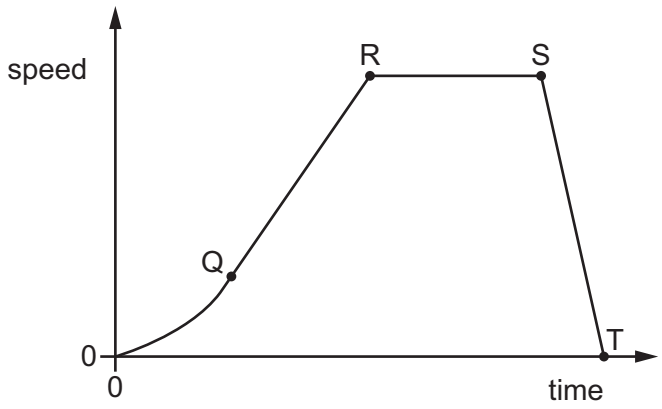
A carbon and hydrogen

B carbon and water

C carbon dioxide and water

D carbon monoxide and water

28 The diagram shows a speed–time graph for a car. Four points are labelled Q, R, S and T.



Between which labelled points does the car move at a constant speed?

A between Q and R, and between S and T

B between Q and R only

C between R and S only

D between S and T only

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29 A car travels at a constant speed along a straight road.

Which statement about the car is correct?

A The resultant force on the car is equal to the weight of the car.

B The resultant force on the car acts in the direction of the motion of the car.

C The resultant force on the car opposes the motion of the car.

D The resultant force on the car is equal to zero.

30 A man lies on the ground, then stands up.

How do the force and the pressure that the man exerts on the ground in each of the two positions compare?

	force on the ground	pressure on the ground
A	equal in both positions	equal in both positions
B	equal in both positions	greater when standing up
C	greater when standing up	equal in both positions
D	greater when standing up	greater when standing up

31 A piece of scientific equipment is taken from the Earth to a distant planet.

Which row describes the properties of the equipment on the distant planet?

	mass	weight
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = the same as on Earth

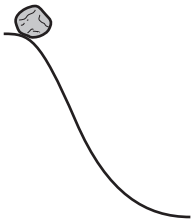
✗ = different on each planet

32 In which situation is potential energy increasing?

A

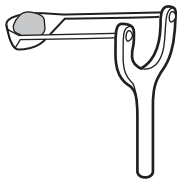
a spring being stretched

B



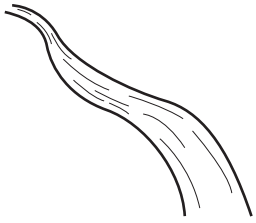
a rock rolling down a hill

C



a stone being released from a catapult and moving horizontally

D



water flowing in a river

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33 Which statement about water is correct?

A It boils at 0 °C and melts at 100 °C.

B It boils at 0 °C and melts at –100 °C.

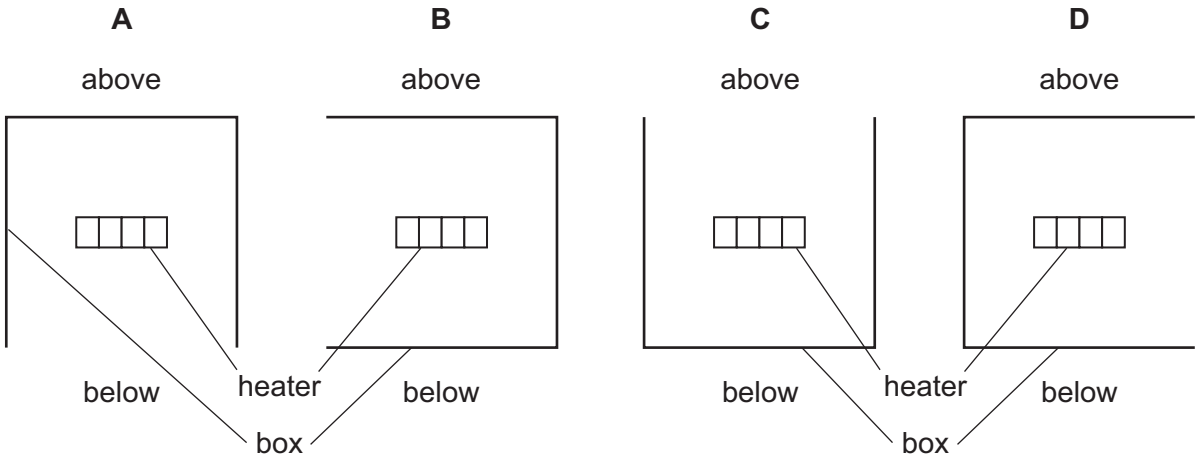
C It boils at 100 °C and melts at –100 °C.

D It boils at 100 °C and melts at 0 °C.

34 An electric heater is placed inside a metal box which has one side open. The diagrams show four possible positions of the box.

The heater is switched on for several minutes.

In which position does the box become the hottest?



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35 A man sitting in a parked car looks in a mirror and sees an image of a sign behind the car.

The diagram shows the image he sees.

image

The man now turns round and looks directly at the sign, not using the mirror.

What does the man see?

A

B

C

D

36 Which statement about sound is **not** correct?

A A sound wave of frequency 2000 Hz can be heard by a healthy human ear.

B Sound waves can travel through a vacuum.

C The loudness of a sound depends on the amplitude of the sound wave.

D The pitch of a sound depends on the frequency of the sound wave.

37 Two identical plastic rods are rubbed with identical cloths.

The rods are moved close together and there is a force between them.

Which statement is correct?

A The rods attract each other because they have opposite charge.

B The rods attract each other because they have the same charge.

C The rods repel each other because they have opposite charge.

D The rods repel each other because they have the same charge.

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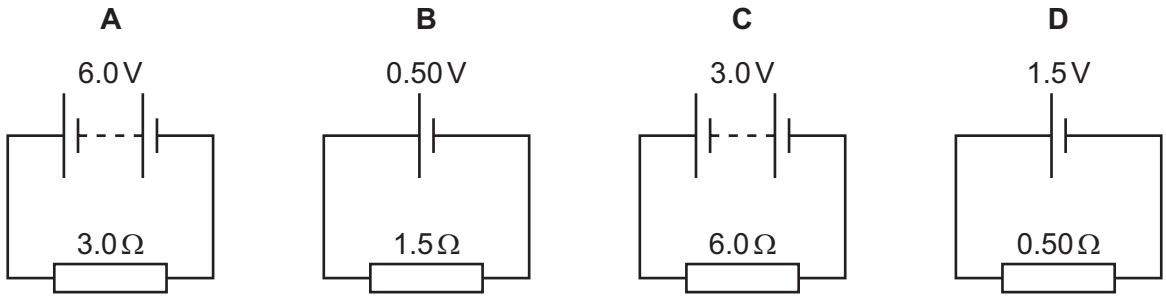
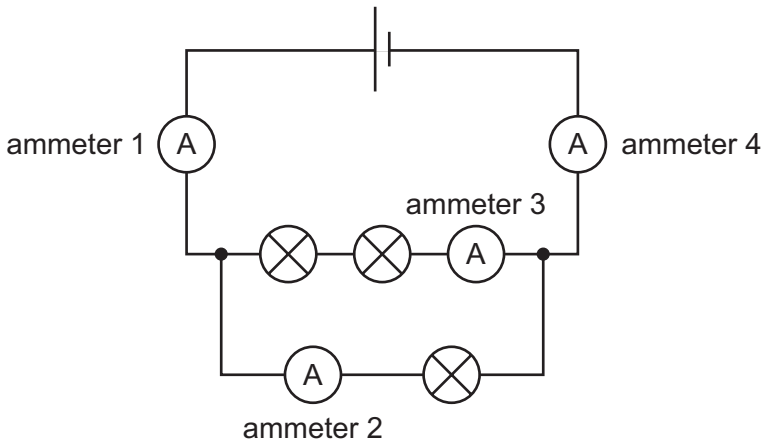
38 In which circuit is there a current of 2.0 A?



39 The diagram shows three identical lamps and four ammeters connected in a circuit.



Which statement about the ammeter readings is correct?

A The reading on ammeter 1 is greater than the reading on ammeter 3.

B The reading on ammeter 1 is greater than the reading on ammeter 4.

C The reading on ammeter 3 is greater than the reading on ammeter 2.

D The reading on ammeter 2 is greater than the reading on ammeter 4.

40 Why is the electricity supply to a mains circuit fitted with a fuse?

A to increase the current in the circuit

B to increase the resistance of the circuit

C to maintain a constant current in the circuit

D to prevent overheating of the cables in the circuit

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The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											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
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 –		

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

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