Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/13**

Paper 1 Multiple Choice (Core) **October/November 2024**

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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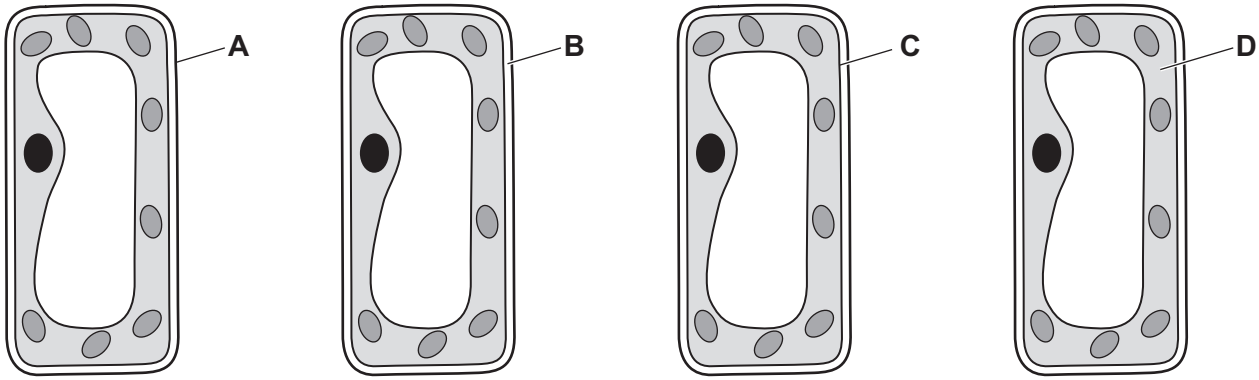
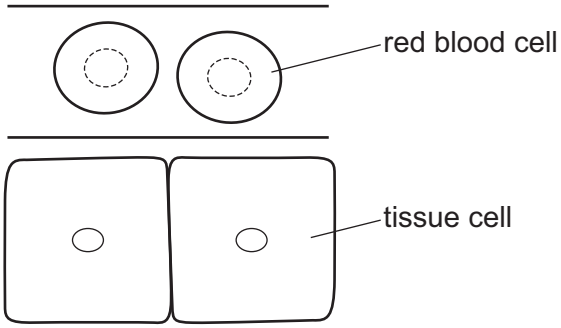
[Turn over

1 Which label shows the cell membrane?



2 The diagram shows two red blood cells inside a capillary and two tissue cells near this capillary.



How does the oxygen in the red blood cells reach the tissue cells?

A by absorption

B by diffusion

C by respiration

D by transpiration

3 When a food sample is heated with Benedict's solution, an orange colour appears.

Which nutrient must be present in the food?

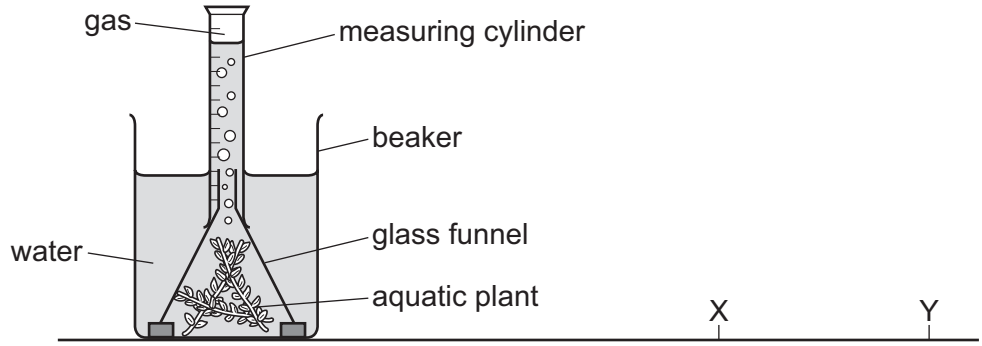
A fat

B protein

C reducing sugar

D starch

4 A student investigates how light affects photosynthesis.



The student shines a light from point Y and measures the volume of gas produced in five minutes.

Which gas is produced, and how does the rate of gas production change when the light is moved from Y to X?

	gas produced	rate of gas production
A	carbon dioxide	decreases
B	carbon dioxide	increases
C	oxygen	decreases
D	oxygen	increases

5 Which component of the diet ensures that ingested food passes through the alimentary canal quickly and efficiently?

A fats

B fibre

C protein

D vitamins

6 What is the pathway taken by water through a plant?

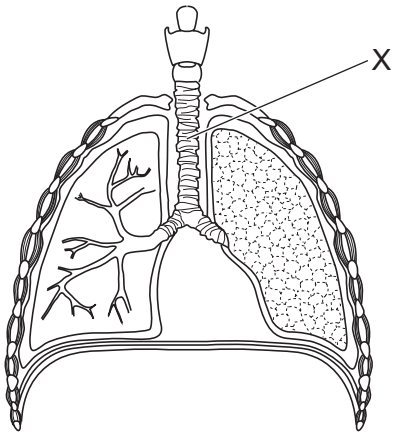
A root hair cell → root cortex cells → xylem → mesophyll cells

B root hair cell → root cortex cells → mesophyll cells → xylem

C xylem → root hair cell → root cortex cells → mesophyll cells

D xylem → mesophyll cells → root cortex cells → root hair cell

7 The diagram shows the human respiratory system.



What is the structure labelled X?

A bronchiole

B intercostal muscle

C rib

D trachea

8 Which row shows effects of increased adrenaline secretion on the body?

	breathing rate	size of pupils
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

9 When a seed is germinated in the dark, the shoot grows upwards.

What is this growth response?

A away from gravity

B away from light

C towards gravity

D towards light

10 Which statement is correct?

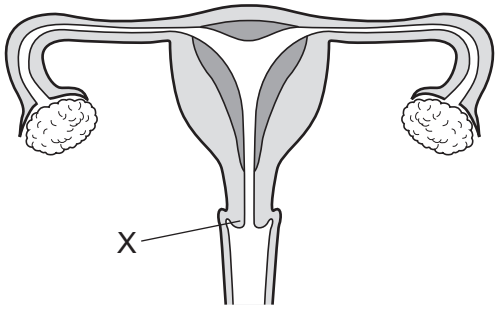
A Asexual reproduction results in the formation of a zygote.

B Asexual reproduction results in genetically identical offspring from one parent.

C Sexual reproduction only occurs in animals.

D Sexual reproduction results in genetically identical offspring from two parents.

11 The diagram shows the female human reproductive system.



What is the name of the structure labelled X?

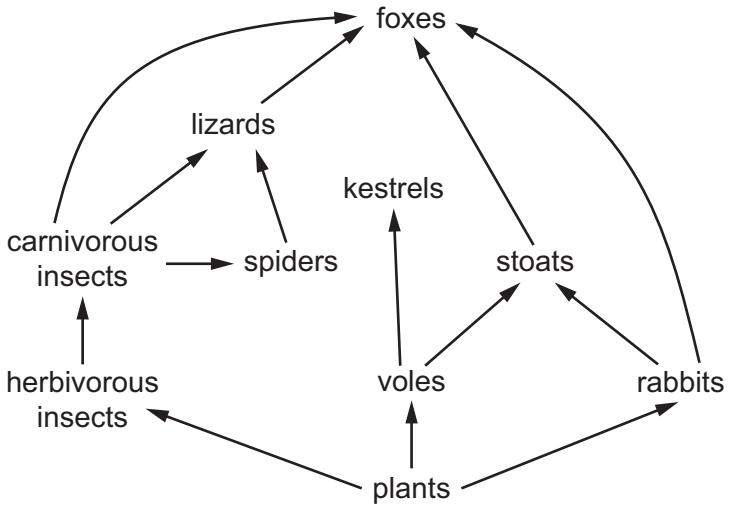
A cervix

B ovary

C uterus

D vagina

12 The diagram shows a food web.



Which organisms in this food web are secondary consumers?

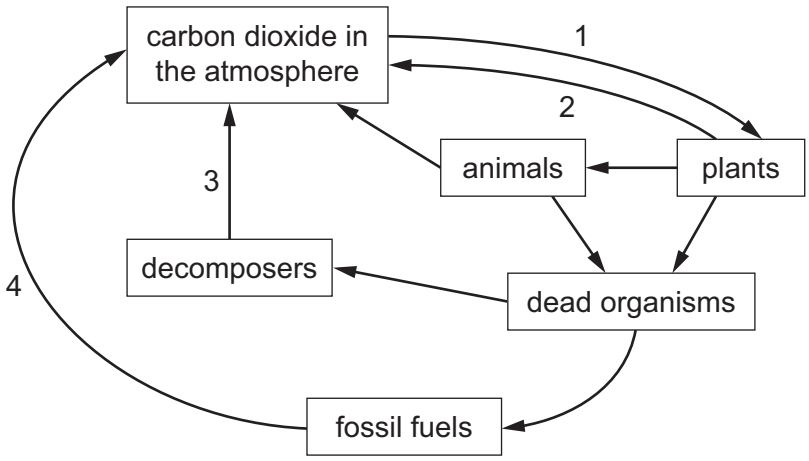
A carnivorous insects and voles

B foxes and lizards

C kestrels and stoats

D spiders and stoats

13 The diagram shows part of the carbon cycle.

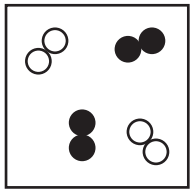


Which processes are represented by 1, 2, 3 and 4?

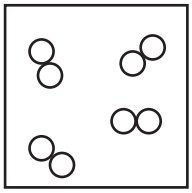
	1	2	3	4
A	photosynthesis	respiration	respiration	combustion
B	photosynthesis	combustion	respiration	respiration
C	respiration	photosynthesis	respiration	combustion
D	respiration	combustion	photosynthesis	respiration

14 Which diagram represents a mixture of different molecules?

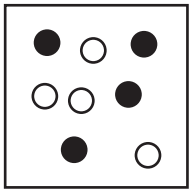
A



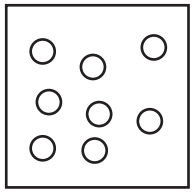
B



C



D



15 Some changes are listed.

1 boiling

2 decomposing

3 evaporating

4 oxidising

Which changes are physical changes?

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

16 Water has the chemical formula H_2O.

Which statement is correct?

A Pure water is a mixture because it contains hydrogen and oxygen.

B Pure water is an element because it contains only one type of molecule.

C Salt water is a compound because it contains salt and water.

D Salt water is a mixture because it contains salt and water.

17 Which two elements combine to form an ionic compound?

A carbon and oxygen

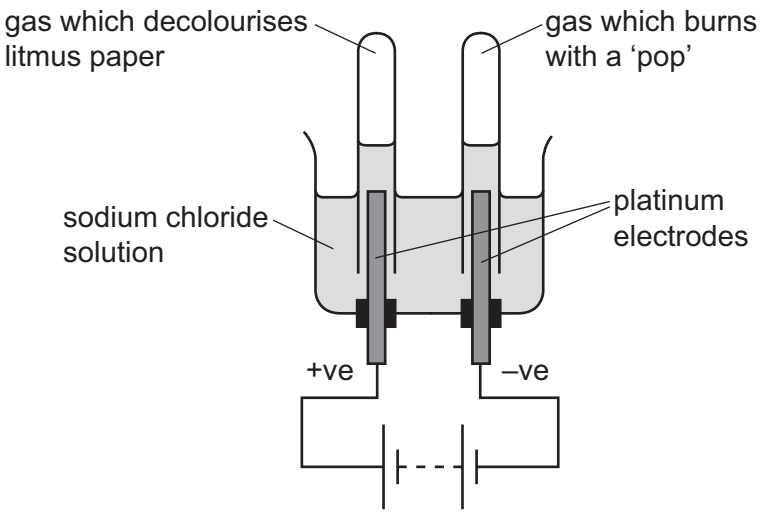
B copper and zinc

C hydrogen and oxygen

D magnesium and chlorine

18 Concentrated aqueous sodium chloride is electrolysed and a gas is collected at each electrode.

One gas decolourises moist litmus paper, the other gas burns with a ‘pop’.



Which statement is correct?

A Chlorine gas is collected at the anode.

B Hydrogen gas is collected at the anode.

C Oxygen gas is collected at the cathode.

D Sodium is formed at the cathode.

19 Which type of reaction occurs when iron is obtained from its oxide using carbon?

A combustion

B neutralisation

C electrolysis

D reduction

20 The steps needed to make pure, dry magnesium sulfate crystals from magnesium oxide and dilute sulfuric acid are listed.

1 filter

2 leave to cool

3 add excess magnesium oxide to sulfuric acid and heat

4 dry

5 filter and wash

6 heat to evaporate some of the water

In which order are these steps carried out?

A $3 \rightarrow 1 \rightarrow 2 \rightarrow 5 \rightarrow 6 \rightarrow 4$

B $3 \rightarrow 1 \rightarrow 6 \rightarrow 2 \rightarrow 5 \rightarrow 4$

C $3 \rightarrow 2 \rightarrow 1 \rightarrow 6 \rightarrow 4 \rightarrow 5$

D $3 \rightarrow 5 \rightarrow 2 \rightarrow 6 \rightarrow 1 \rightarrow 4$

21 Which row describes trends shown by the elements in Group I and Group VII of the Periodic Table as the groups are descended?

	Group I	Group VII
A	melting point increases	colour becomes darker
B	melting point decreases	colour becomes darker
C	they become more reactive	colour becomes lighter
D	they become less reactive	colour becomes lighter

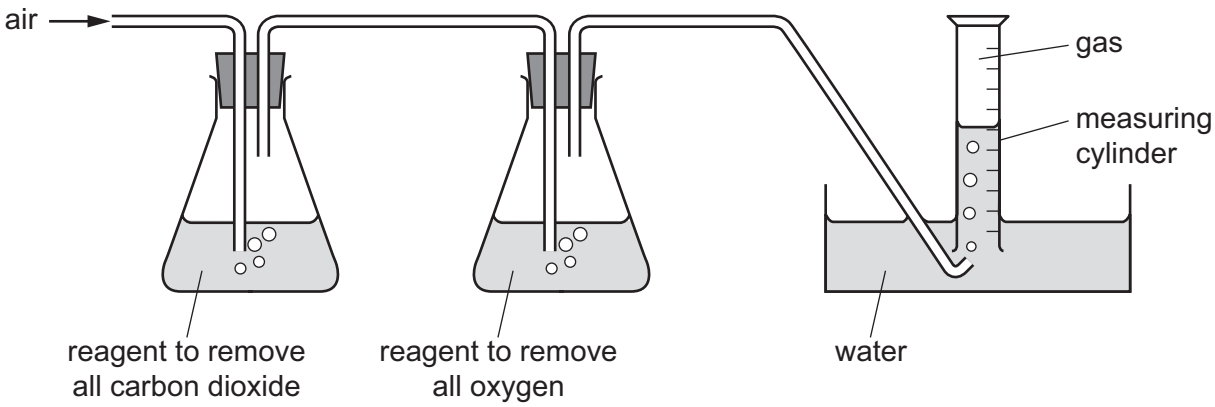
22 What is the electronic structure of a noble gas?

A 2 **B** 2,1 **C** 2,8,2 **D** 2,8,7

23 Which row explains why carbon is used to extract copper from copper oxide and identifies the type of reaction that occurs during the extraction?

	explanation	type of reaction
A	carbon is more reactive than copper	redox
B	carbon is more reactive than copper	thermal decomposition
C	carbon is less reactive than copper	redox
D	carbon is less reactive than copper	thermal decomposition

24 A 100 cm^3 sample of clean air is passed into the apparatus as shown.



What is the volume and the composition of the gas collected in the measuring cylinder?

	volume / cm^3	composition
A	21	pure nitrogen
B	21	nitrogen and other gases
C	79	nitrogen and other gases
D	79	pure nitrogen

25 Which substance is a greenhouse gas?

A carbon monoxide

B chlorine

C methane

D nitrogen

26 Which statement explains why alkanes are saturated compounds?

A They are not very reactive.

B They contain double covalent bonds.

C They contain carbon and hydrogen only.

D They contain only single covalent bonds.

27 Which statement about alkenes is correct?

A They are manufactured in addition polymerisation reactions.

B They react with aqueous bromine to give colourless products.

C They are compounds containing carbon, hydrogen and oxygen.

D They are cracked to produce other compounds.

28 Which expression is the definition of speed?

A $\frac{\text{change in acceleration}}{\text{time taken}}$

B $\frac{\text{distance travelled}}{\text{time taken}}$

C $\frac{\text{time taken}}{\text{change in acceleration}}$

D $\frac{\text{time taken}}{\text{distance travelled}}$

29 A solid, rectangular block of wood has length 4.0 cm, width 5.0 cm and height 6.0 cm.

The mass of the block is 90 g.

What is the density of the wood?

A $0.75\,g/cm^3$ **B** $1.3\,g/cm^3$ **C** $4.5\,g/cm^3$ **D** $6.0\,g/cm^3$

30 Which change **cannot** be caused by a force acting on an object?

A change of mass

B change of motion

C change of shape

D change of size

31 Student R has a mass of 80 kg. Student S has a mass of 50 kg.

On day 1, the students walk up the stairs to the top of a building in 15 minutes.

On day 2, the students climb a vertical wall to the top of the same building in 2.0 hours.

Which student uses the greatest power in reaching the top of the building, and when?

A student R on day 1

B student S on day 1

C student R on day 2

D student S on day 2

32 In which situation is **no** energy transfer occurring?

A a ball falling from rest through the air to the ground

B a battery lighting a lamp

C a metal block hanging at rest from a stretched spring

D a saucepan being heated

33 Benzene and glycerine are two substances.

The table gives the melting point and the boiling point of benzene and of glycerine.

	melting point / °C	boiling point / °C
benzene	5.4	80
glycerine	18	290

At which temperature are both benzene and glycerine liquid?

A 0 °C **B** 50 °C **C** 90 °C **D** 300 °C

34 Which substances expand when heated?

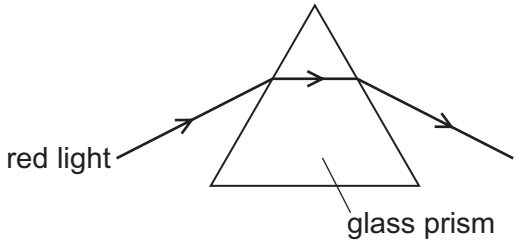
A gases only

B liquids only

C solids only

D solids, liquids and gases

35 A ray of red light enters a triangular glass prism. The ray passes through the prism and emerges travelling in a different direction.



Which effect causes the changes of direction?

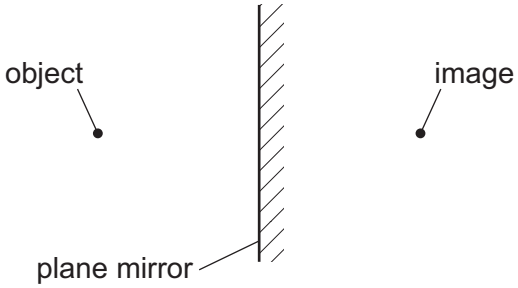
A absorption

B convection

C reflection

D refraction

36 An object is placed in front of a plane mirror. An image of the object is formed in the position shown.



The object is now moved 1.0 cm to the left.

What happens to the image?

A It moves 1.0 cm to the left.

B It moves 1.0 cm to the right.

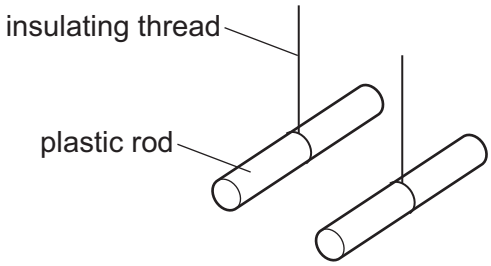
C It moves 2.0 cm to the left.

D It moves 2.0 cm to the right.

37 An uncharged plastic rod is rubbed with a cloth and suspended by an insulating thread.

The process is repeated using a second identical rod and a second identical cloth.

The rods are then placed close to each other.



What happens, and why?

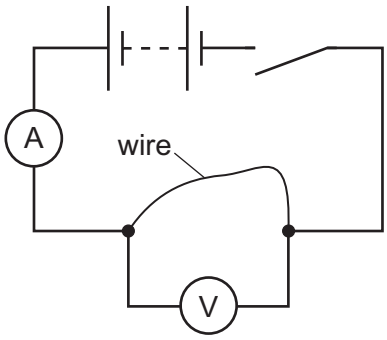
A The rods attract each other because they have like charges.

B The rods attract each other because they have unlike charges.

C The rods repel each other because they have like charges.

D The rods repel each other because they have unlike charges.

38 A student sets up a circuit to find the resistance of a length of wire.



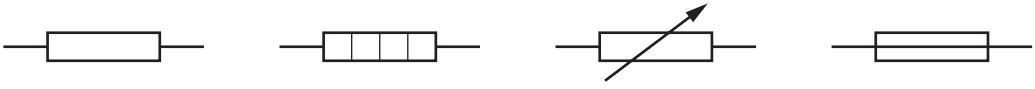
When the switch is closed, the ammeter reads 2.0 A and the voltmeter reads 10 V.

What is the resistance of the length of wire?

A 0.20 Ω **B** 5.0 Ω **C** 8.0 Ω **D** 20 Ω

39 What is the circuit symbol for a fuse?

A **B** **C** **D**



40 A person uses an electric lawnmower to cut the grass in a garden.

Which situations are electrical hazards?

1 using the lawnmower when the insulation on the cable is damaged

2 plugging the lawnmower into an electric socket in a garage

3 using the lawnmower when it is raining

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

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 –	113 Nh nihonium –	114 Fl flerovium –	115 Mc moscovium –	116 Lv livermorium –	117 Ts tennessine –	118 Og oganesson –

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.).