Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/13**

Paper 1 Multiple Choice (Core) **May/June 2019**

45 minutes

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

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.

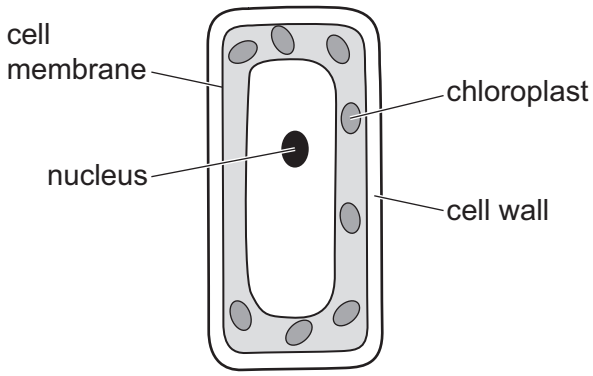
Read the instructions on the Answer Sheet very carefully.

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 **15** printed pages and **1** blank page.

1 Which diagram correctly represents a plant cell?

A



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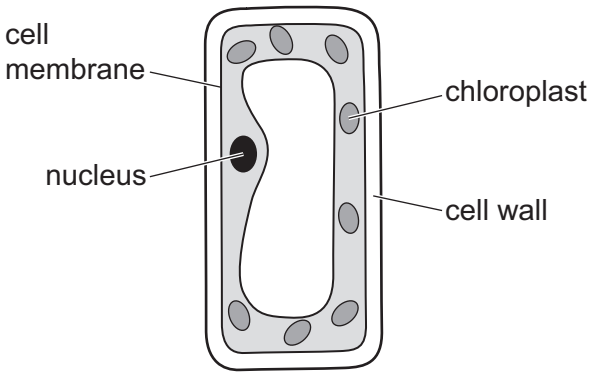

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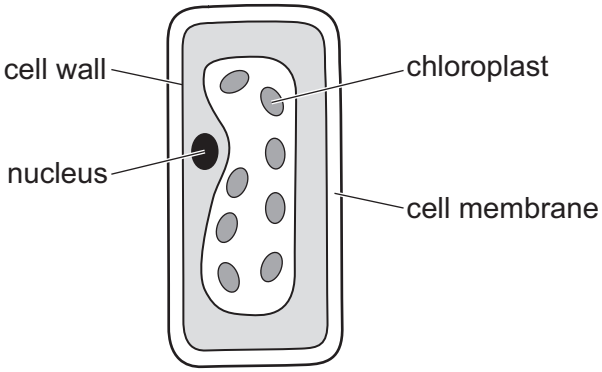

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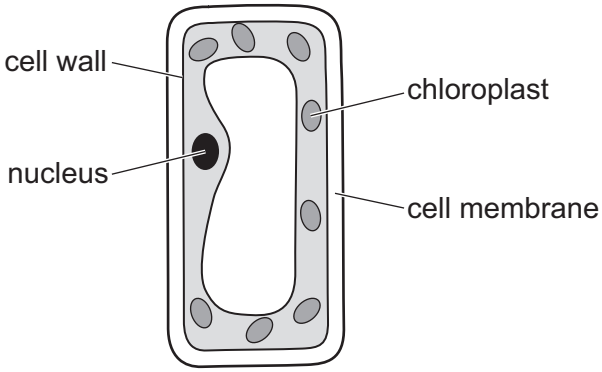


2 Which substance moves through a partially permeable membrane by osmosis?

A hormones

B oxygen

C sugar

D water

3 Which substances are used and produced during photosynthesis?

	substances used	substances produced
A	carbon dioxide and glucose	oxygen and water
B	carbon dioxide and water	glucose and oxygen
C	glucose and oxygen	carbon dioxide and water
D	oxygen and water	carbon dioxide and glucose

4 What is a function of the small intestine?

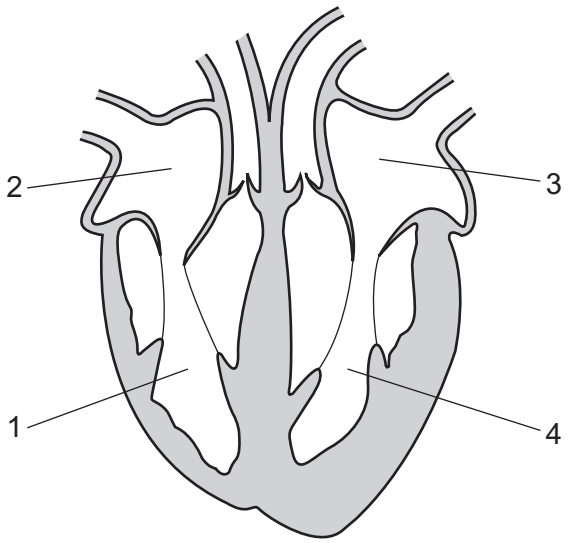
A It cuts food into small pieces.

B It provides a large surface area for absorption.

C It provides space for the storage of faeces.

D It stores food.

5 The diagram shows a section through the heart.



Which labels show the two ventricles in the heart?

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

6 Physical activity affects our rate and depth of breathing.

What happens during **increased** physical activity?

	rate of breathing	depth of breathing
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

7 How does adrenaline affect blood glucose concentration and pulse rate?

	blood glucose concentration	pulse rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

8 Diagram 1 shows a growing seedling after the first few days' growth.

The seedling was then rotated, held in the position shown in diagram 2 and placed in the dark for three days.

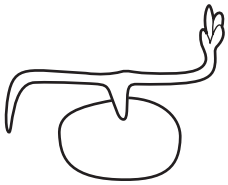


diagram 1

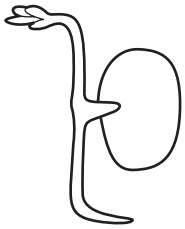
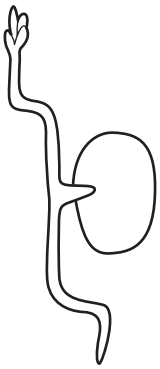


diagram 2

What is the shape of the seedling three days later?

A

B



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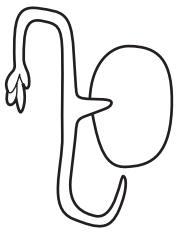
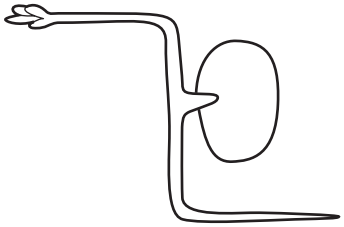


D



9 What are the features of sexual reproduction?

	fusion of nuclei	nature of offspring
A	no	genetically dissimilar
B	yes	genetically identical
C	no	genetically identical
D	yes	genetically dissimilar

10 Which process is the transfer of pollen grains from the anther to the stigma?

A fertilisation

B germination

C pollination

D transpiration

11 During sexual intercourse the penis transfers sperm cells to the vagina.

What is the pathway for sperm cells from their site of production to the vagina?

A sperm ducts → testes → urethra → vagina

B testes → sperm ducts → urethra → vagina

C testes → urethra → sperm ducts → vagina

D urethra → testes → sperm ducts → vagina

12 What is the source of energy input in food chains and food webs?

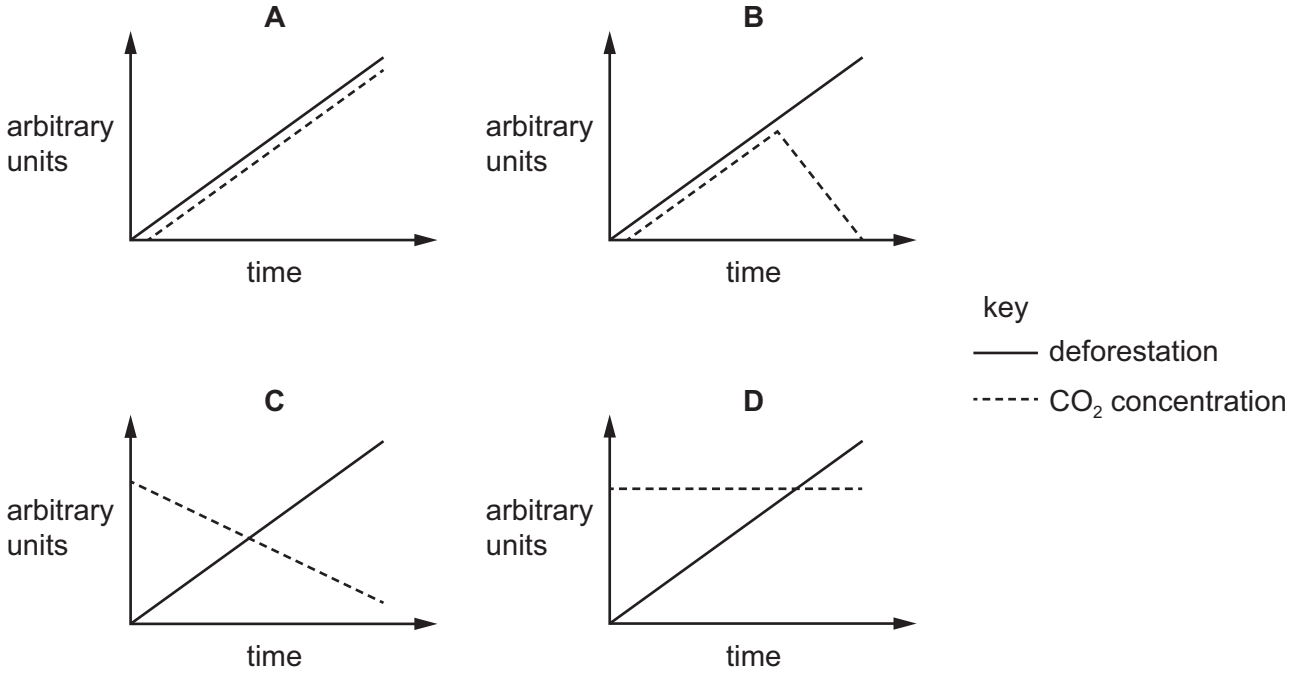
A carbohydrates

B nutrients in the soil

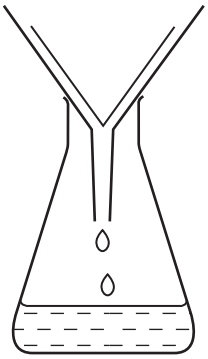
C oxygen

D the Sun

13 Which graph shows the relationship between the increase in deforestation and the carbon dioxide concentrations in the atmosphere?



14 The diagram shows apparatus used for filtration.



Why can sugar and salt **not** be separated by using this apparatus?

A They are both compounds.

B They are both white.

C They both dissolve in water.

D They both have the same size particles.

15 Which description of the named substance is correct?

	substance	element or mixture
A	air	mixture
B	brass	element
C	carbon dioxide	element
D	hydrogen chloride	mixture

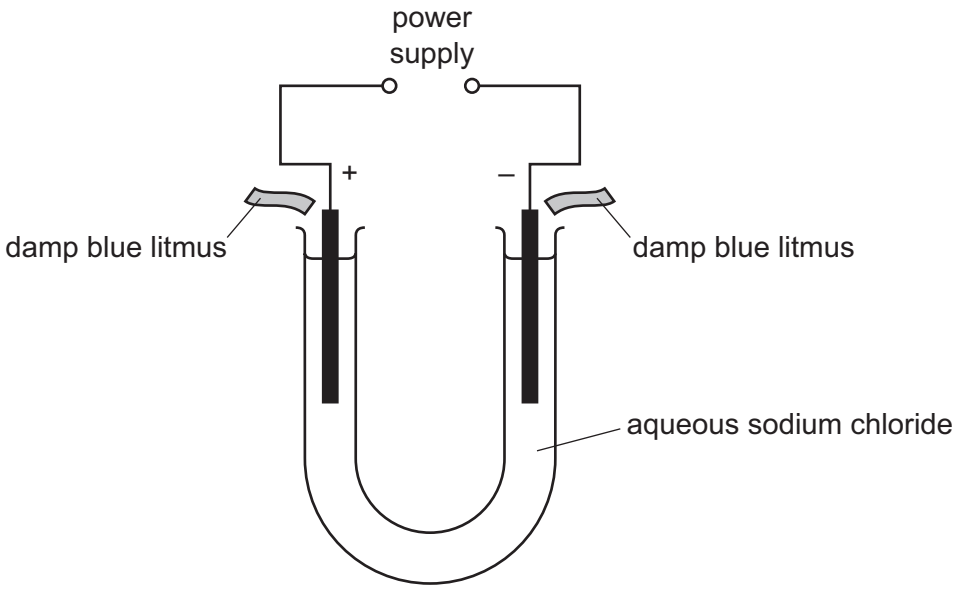
16 The equation for the reaction between magnesium and dilute hydrochloric acid is shown.

$$Mg + xHCl \rightarrow MgCl_2 + yH_2$$

What are the values of *x* and *y*?

	x	*y*
A	1	1
B	1	2
C	2	1
D	2	2

17 Concentrated aqueous sodium chloride is electrolysed using the apparatus shown.



A piece of damp blue litmus paper is held above each electrode.

Which row shows what happens to the colour of the litmus paper during the electrolysis?

	positive electrode	negative electrode
A	litmus is unchanged	litmus is unchanged
B	litmus is unchanged	litmus turns white
C	litmus turns white	litmus is unchanged
D	litmus turns white	litmus turns white

18 The temperatures at the start and at the end of four chemical reactions are shown.

Which reaction is the **most** exothermic?

	temperature at start of reaction / °C	temperature at end of reaction / °C
A	10	30
B	15	14
C	18	35
D	20	18

19 Zinc reacts with excess dilute sulfuric acid to form hydrogen gas.

Copper sulfate can act as a catalyst for this reaction.

Which statement is **not** correct?

A If more concentrated sulfuric acid is used the rate of the reaction increases.

B If the temperature is increased it takes less time for the zinc to react completely.

C Larger pieces of zinc produce more hydrogen every ten seconds than the same mass of powdered zinc.

D When copper sulfate is added to the mixture more hydrogen is formed every second.

20 When hydrogen gas is passed over heated lead oxide, lead and water are produced.

$$\text{lead oxide} + \text{hydrogen} \rightarrow \text{lead} + \text{water}$$

Which substance is reduced during the reaction?

A hydrogen

B lead

C lead oxide

D water

21 Which aqueous ion gives a white precipitate with aqueous sodium hydroxide and with aqueous ammonia?

A Cu^{2+} **B** Fe^{2+} **C** Fe^{3+} **D** Zn^{2+}

22 Which row describes the physical state of the Group VII elements at room temperature?

	chlorine	bromine	iodine
A	gas	gas	liquid
B	gas	liquid	solid
C	liquid	liquid	gas
D	liquid	solid	solid

23 Which two elements do **not** form an alloy?

A carbon and sulfur

B carbon and iron

C copper and zinc

D silver and gold

24 Which process is used to extract copper from copper oxide?

A heating copper oxide with carbon

B heating copper oxide with carbon dioxide

C heating copper oxide with hydrochloric acid

D heating copper oxide with steam

25 Why is chlorine added to water during its purification for drinking?

A to dissolve solid impurities

B to kill microorganisms

C to remove halide ions

D to remove soluble impurities

26 Which statement shows that petroleum is a mixture?

A Petroleum can be burned as a fuel.

B Petroleum can be separated into fractions by distillation.

C Petroleum is a fossil fuel formed over millions of years.

D Petroleum is a thick, black liquid.

27 Which substances react together?

1 ethene and methane

2 ethene and bromine

3 ethene and oxygen

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

28 A bag of flour has a mass of 540 g. The acceleration of free fall is $10\,m/s^2$.

What is the weight of the bag of flour?

A 5.4 N **B** 54 N **C** 540 N **D** 5400 N

29 What is the expression for density?

A $\frac{\text{mass}}{\text{volume}}$ **B** $\frac{\text{volume}}{\text{mass}}$ **C** $\frac{\text{volume}}{\text{weight}}$ **D** $\frac{\text{weight}}{\text{volume}}$

30 Which property of an object **cannot** be changed by a force?

A mass

B motion

C shape

D size

31 The temperature of a gas rises.

What happens to the molecules of the gas?

A Their average speed decreases.

B Their average speed increases.

C They contract.

D They expand.

32 Benzene and glycerine are two substances.

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

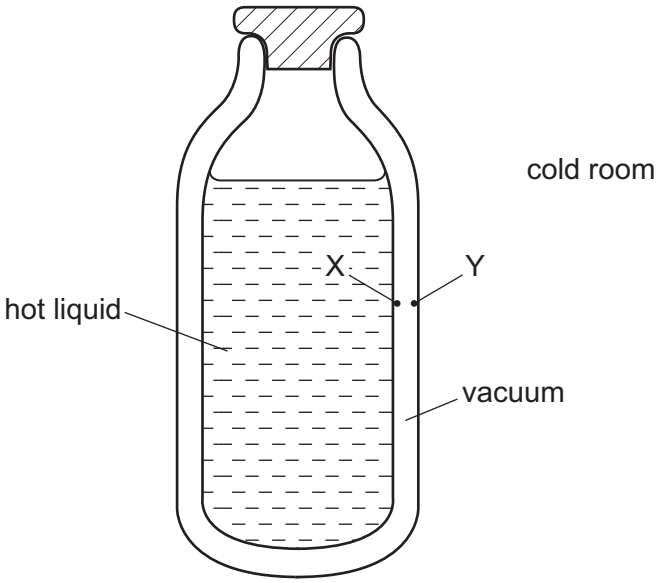
	melting point / °C	boiling point / °C
benzene	5.4	80
glycerine	18	290

At which temperature are both benzene and glycerine liquid?

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

33 The diagram shows a vacuum flask containing a hot liquid in a cold room.

X and Y are points on the inside surfaces of the walls of the flask.



How is thermal energy transferred through the vacuum between X and Y?

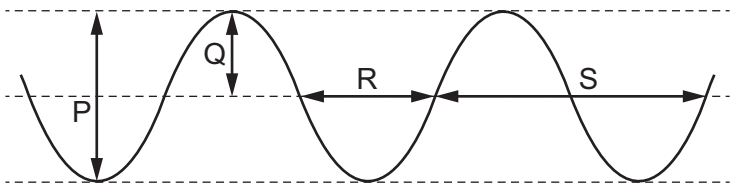
A by conduction and convection

B by conduction only

C by radiation and convection

D by radiation only

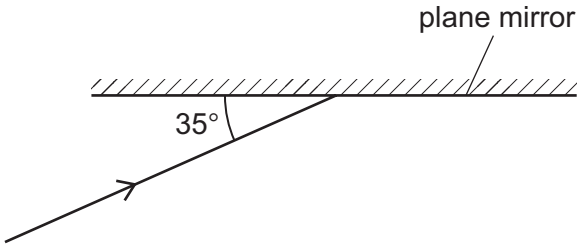
34 The diagram represents a wave at one moment.



Which labelled arrows represent the amplitude and the wavelength of the wave?

	amplitude	wavelength
A	P	R
B	P	S
C	Q	R
D	Q	S

35 The diagram shows light incident on a plane mirror.



The angle between the ray and the mirror is 35°.

What is the angle of reflection?

A 35° **B** 55° **C** 70° **D** 110°

36 Which electromagnetic radiation has the lowest frequency?

A gamma

B infrared

C radio

D ultraviolet

37 Three loudspeakers vibrate at different frequencies of 5 hertz, 15 kilohertz and 50 kilohertz.

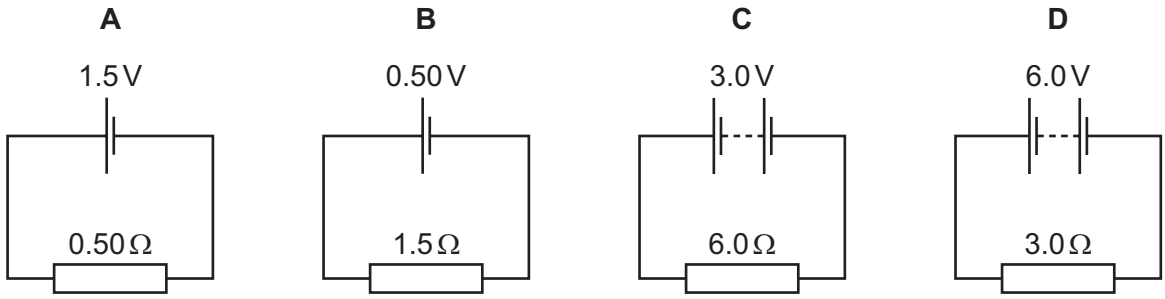
Which row shows whether the vibrations from each loudspeaker can be heard by a healthy human ear?

	5 hertz	15 kilohertz	50 kilohertz
A	no	no	no
B	no	yes	no
C	yes	no	yes
D	yes	yes	yes

38 What is the unit for electromotive force (e.m.f.)?

A J **B** N **C** V **D** W

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



40 A mains circuit can safely supply a current of up to 40 A.

The current in a hairdryer is 2 A when it is operating normally. The hairdryer is connected to the mains by a lead which can safely carry up to 5 A.

What is the correct fuse to protect the hairdryer?

A 1 A fuse

B 3 A fuse

C 10 A fuse

D 50 A fuse

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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.).