Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/13**

Paper 1 Multiple Choice (Core) **May/June 2018**

45 minutes

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

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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 rows correctly match characteristics of living things with their descriptions?

	characteristic	description
1	excretion	removing the waste products of metabolism
2	growth	making more living things of the same type
3	nutrition	taking in or producing food
4	respiration	releasing energy from food

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

2 Which statement about cells is correct?

A Cell membranes are found only in animal cells.

B Cell membranes are found only in plant cells.

C Cell walls are found only in animal cells.

D Cell walls are found only in plant cells.

3 Tests were carried out on a colourless liquid, with the following results.

test	colour obtained
Benedict's	blue
biuret	purple
iodine	blue/black

What did the colourless liquid contain?

A protein only

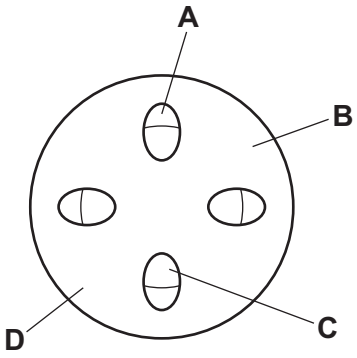
B protein and reducing sugar only

C protein and starch only

D protein, reducing sugar and starch

4 The cut end of a leafy stem of a plant was placed in a beaker of red-coloured water. Some time later, a transverse section of its stem was cut.

Which part of the section would be coloured red?



5 Which process carried out by living things uses oxygen?

A digestion

B excretion

C photosynthesis

D respiration

6 What is the correct pathway for air during inspiration?

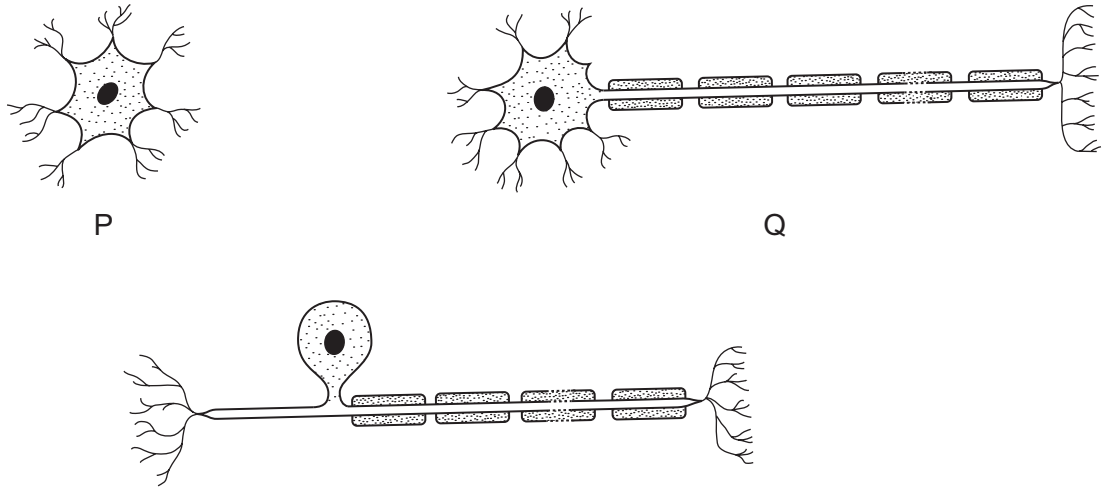
A alveoli → bronchi → bronchiole → larynx

B alveoli → bronchiole → bronchi → larynx

C larynx → bronchi → bronchiole → alveoli

D larynx → bronchiole → bronchi → alveoli

7 The diagram shows three types of nerve cell.



In which order do impulses pass through the nerve cells in a reflex arc?

A P → Q → R

B P → R → Q

C Q → R → P

D R → P → Q

8 Which statement about the hormone adrenaline is correct?

A Adrenaline decreases blood glucose concentration.

B Adrenaline is carried by the blood.

C Adrenaline is destroyed by the kidneys.

D Adrenaline slows down the heart rate.

9 By which process does oxygen pass from the alveoli to the blood capillaries in the lungs?

A diffusion

B evaporation

C secretion

D transpiration

10 What is **not** a possible outcome in the offspring of two homozygous parents?

A all heterozygous

B all homozygous dominant

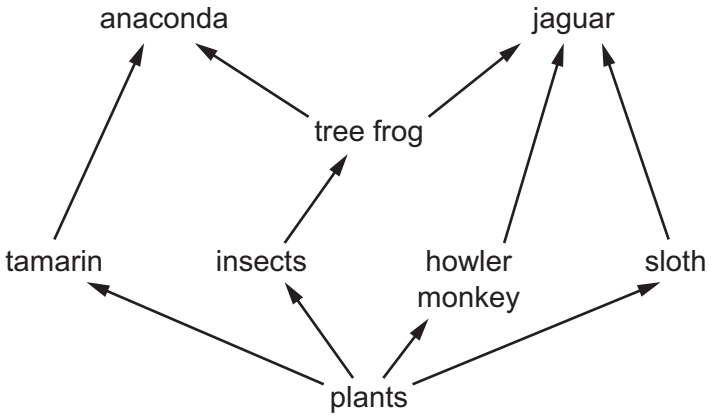
C all homozygous recessive

D 3 heterozygous : 1 homozygous

11 What is the purpose of artificial selection and which types of organisms may be selected?

	purpose of artificial selection	types of organisms
A	producing organisms with a greater chance of survival in the wild	animals and plants
B	producing organisms with a greater chance of survival in the wild	plants only
C	producing organisms with increased economic importance	animals and plants
D	producing organisms with increased economic importance	plants only

12 The diagram shows a food web from a rainforest.



Which organisms in the food web will provide carbon atoms for the tree frog?

	anacondas	insects	plants
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

13 Forests are cut down and burnt in deforestation programmes.

As a result of this, which gas in the air will be increased in concentration in the atmosphere?

A carbon dioxide

B hydrogen

C nitrogen

D oxygen

14 Which statement about atoms is correct?

A All atoms contain equal numbers of neutrons and protons.

B All atoms of the same element have the same number of neutrons.

C The Periodic Table lists atoms in increasing mass number.

D The smallest unit of an element is an atom.

15 Pure copper chloride can be obtained from a mixture of powdered copper and solid copper chloride.

Three stages in the method are listed.

P add water and stir

Q crystallise

R filter

In which order are these stages carried out in order to obtain pure copper chloride from the mixture?

A P $\rightarrow$ Q $\rightarrow$ R

B P $\rightarrow$ R $\rightarrow$ Q

C R $\rightarrow$ P $\rightarrow$ Q

D R $\rightarrow$ Q $\rightarrow$ P

16 One isotope of phosphorus is represented by the symbol $^{31}_{15}P$.

Which row describes a different isotope of phosphorus?

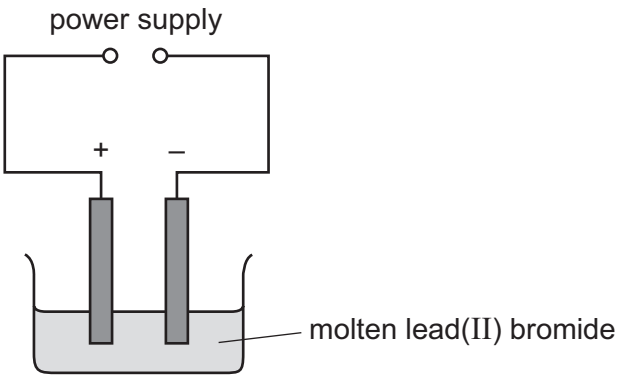
	neutrons	protons	nucleon number
A	15	15	30
B	15	16	31
C	16	15	31
D	16	16	32

17 The formula of ethanol is C_2H_5OH.

How many different elements are present in ethanol?

A 1 **B** 3 **C** 4 **D** 9

18 Molten lead(II) bromide is electrolysed as shown.



An element is produced at the negative electrode.

What is the name of the element and of the negative electrode?

	element	negative electrode
A	bromine	anode
B	bromine	cathode
C	lead	anode
D	lead	cathode

19 Magnesium and hydrochloric acid react with each other.

Which conditions produce the greatest rate of reaction?

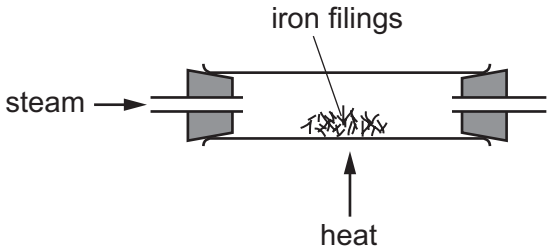
A high temperature, magnesium powder and concentrated acid

B high temperature, magnesium ribbon and dilute acid

C low temperature, magnesium powder and dilute acid

D low temperature, magnesium ribbon and concentrated acid

20 When iron is heated with steam, a black solid is formed.



The equation for the reaction is shown.

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

Which statement about this reaction is correct?

A Iron has been oxidised because it has gained oxygen.

B Iron has been reduced because it removed oxygen from water.

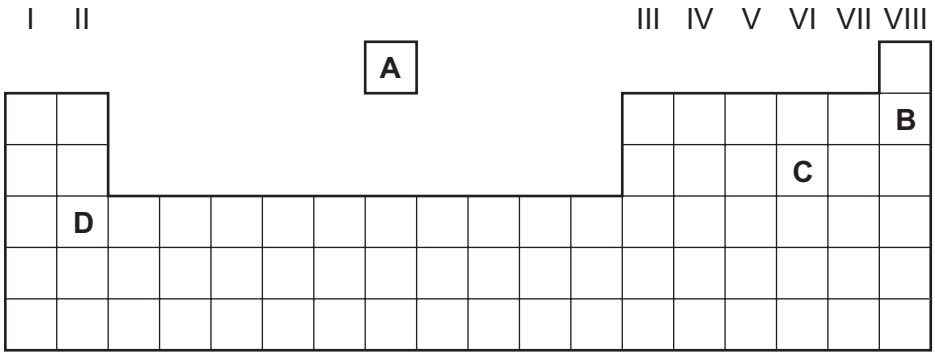
C Iron oxide has been reduced because it contains oxygen.

D Water has been oxidised because it contains oxygen.

21 Element X burns in oxygen to produce an oxide.

An aqueous solution of the oxide turns red litmus paper to blue.

What is the position of element X in the Periodic Table?



22 What is **not** a property of a transition element?

A acts as a catalyst

B forms coloured compounds

C high melting point

D low density

23 Which row shows the order of reactivity of the metals?

	least reactive →			most reactive
A	copper	iron	zinc	magnesium
B	copper	zinc	iron	magnesium
C	magnesium	iron	zinc	copper
D	magnesium	zinc	iron	copper

24 Which two processes are used to purify water?

A chlorination and evaporation

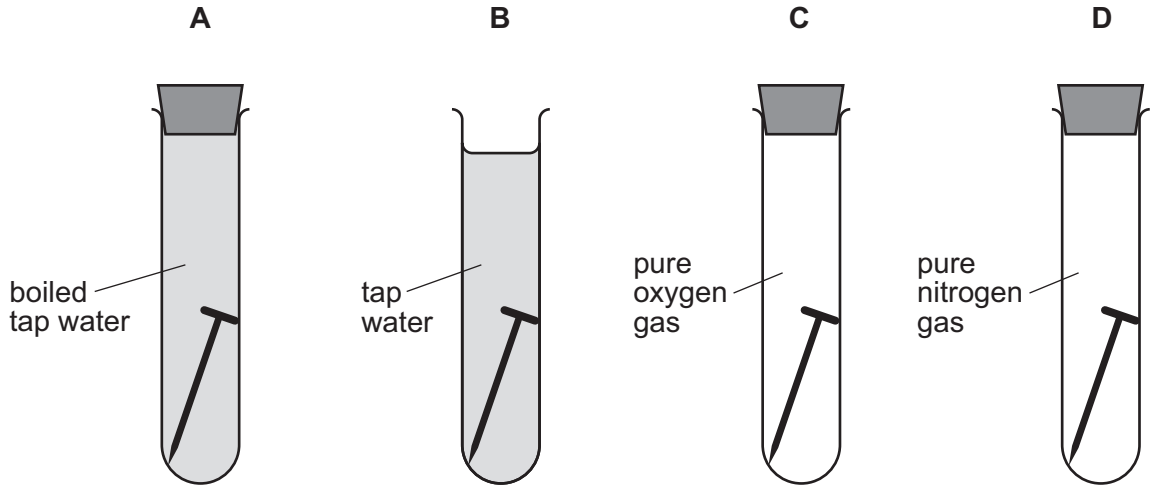
B chlorination and filtration

C crystallisation and evaporation

D crystallisation and filtration

25 Four iron nails are placed in four test-tubes as shown.

In which test-tube does the iron nail rust most quickly?



26 Calcium carbonate is decomposed by heating in an industrial process.

The equation for this reaction is shown.

$$\text{calcium carbonate} \rightarrow \text{calcium oxide} + \text{carbon dioxide}$$

Which statement is **not** correct?

A The common name for calcium carbonate is limestone.

B The common name for calcium oxide is lime.

C Calcium oxide is used to neutralise alkaline soil.

D Calcium oxide is used to neutralise industrial waste products.

27 Poly(ethene) is made from ethene.

Which statements about ethene and poly(ethene) are correct?

1 Ethene contains carbon to carbon single bonds.

2 Ethene decolourises aqueous bromine.

3 Poly(ethene) is unsaturated.

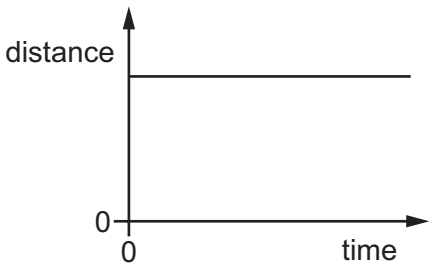
4 Poly(ethene) is made by addition polymerisation.

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

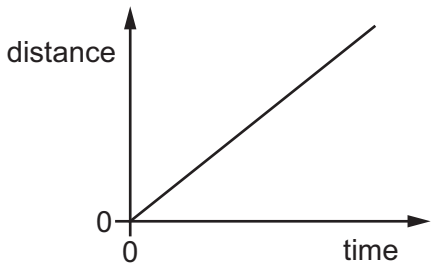
28 The diagrams show two distance-time graphs and two speed-time graphs.

Which graph represents an object that is **not** moving?

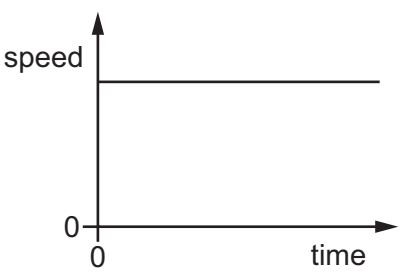
A



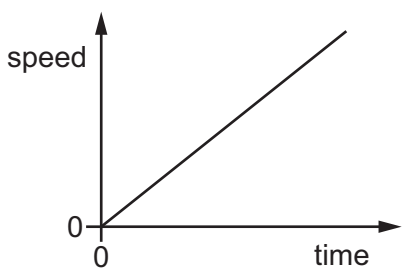
B



C



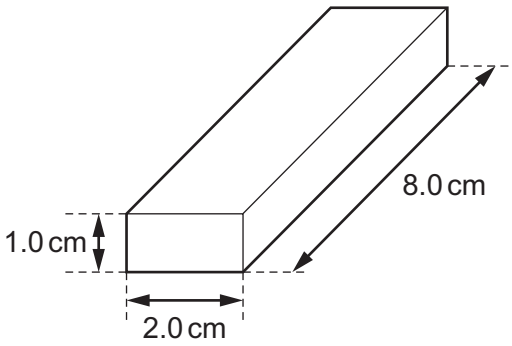
D



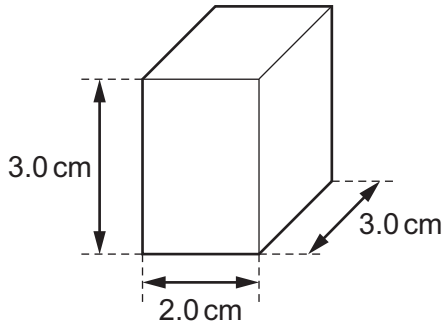
29 The diagrams show four solid blocks with the same mass.

Which block is made from the **least** dense material?

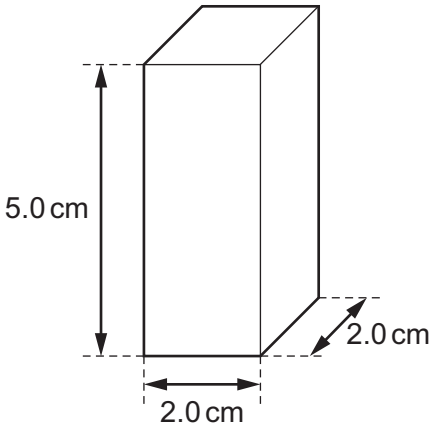
A



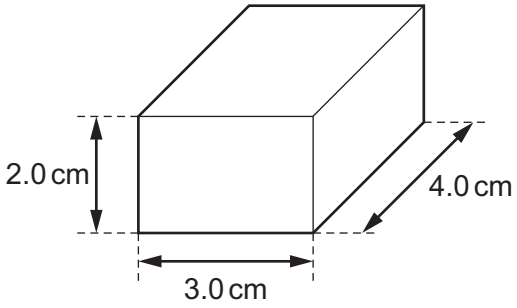
B



C



D



30 The diagram shows an object being acted on by four forces.

What is the resultant force acting on the object?

A 2.0 N to the left

B 5.0 N to the left

C 8.0 N to the right

D 20 N to the right

31 Which form of energy is due to the motion of an object?

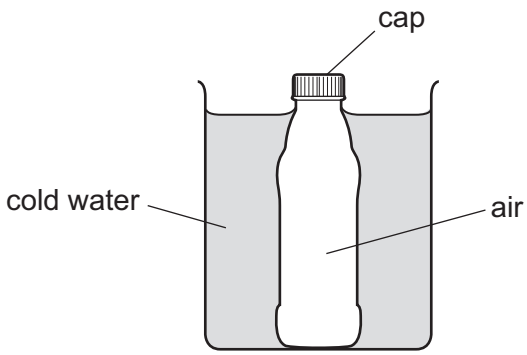
A chemical

B gravitational

C kinetic

D thermal

32 A glass bottle containing warm air is sealed with a screw cap and then cooled in cold water.



The contraction of the glass bottle can be ignored.

What remains the same during the cooling?

A the air pressure inside the bottle

B the energy of the air molecules in the bottle

C the force on the cap made by the air molecules in the bottle

D the volume of air in the bottle

33 A solid piece of metal is placed in a hot furnace. The temperature of the metal increases, then stays constant for a period of time and then increases again.

What is happening to the metal during the period of constant temperature?

A It is boiling.

B It is condensing.

C It is melting.

D It is solidifying.

34 What is the name of the distance between one wave crest and the next?

A amplitude

B frequency

C speed

D wavelength

35 A person stands in front of a vertical mirror.

Which statement correctly describes the image produced by the mirror?

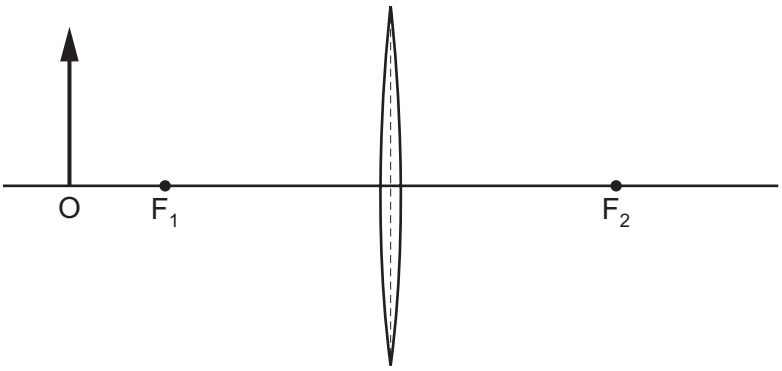
A upright and real

B upright and virtual

C upside down and real

D upside down and virtual

36 The diagram shows an object O near a thin converging lens. One principal focus is labelled F_1 and the other is labelled F_2.



Where is the image of the object formed?

A to the left of the object

B between F_1 and the lens

C between the lens and F_2

D to the right of F_2

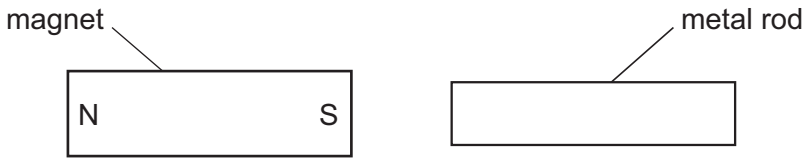
37 For security, luggage is scanned at an airport.

Some television signals are transmitted by satellite to Earth.

Which row gives the type of electromagnetic wave for each of these uses?

	scanning luggage	satellite television
A	microwaves	infra-red
B	microwaves	microwaves
C	X-rays	infra-red
D	X-rays	microwaves

38 A bar magnet is brought near to a metal rod.



The magnet is now turned around so that the N-pole is on the right. The magnet is again brought near to the metal rod.

In both cases the metal rod is attracted to the magnet.

What could the metal rod be?

A another bar magnet

B a piece of aluminium

C a piece of copper

D a piece of iron

39 Which row correctly states whether the unit for electromotive force (e.m.f.), mass and weight is the newton?

	electromotive force (e.m.f.)	mass	weight
A	no	no	yes
B	no	yes	yes
C	yes	no	no
D	yes	yes	no

40 A lamp is powered by a 3.0 V battery. The resistance of the lamp is 60 Ω.

What is the current in the lamp?

A 0.050 mA **B** 20 mA **C** 50 mA **D** 180 mA

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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.).