



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/12

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)

* 2 3 7 7 4 8 7 9 6 3 *



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

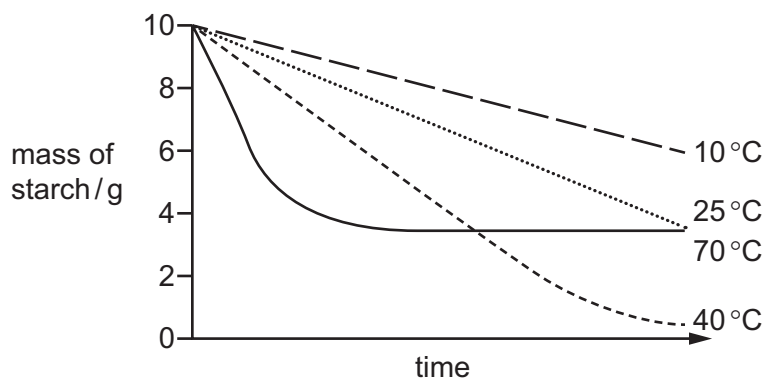
2 Which statement about cells is correct?

- 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 Which line shows the structures in increasing size?

- A** chromosome → gamete → gene → nucleus
- B** chromosome → nucleus → gene → gamete
- C** gene → chromosome → gamete → nucleus
- D** gene → chromosome → nucleus → gamete

4 The graph shows the rate at which 10g of starch is broken down by amylase at four temperatures.



Which is the optimum temperature?

- A** 10°C
- B** 25°C
- C** 40°C
- D** 70°C

- 5 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
- 6 Which statement is correct?
- A** The pulmonary artery carries deoxygenated blood away from the left ventricle.
- B** The pulmonary artery carries deoxygenated blood away from the right ventricle.
- C** The pulmonary vein carries oxygenated blood away from the left ventricle.
- D** The pulmonary vein carries oxygenated blood away from the right ventricle.
- 7 By which process does oxygen pass from the alveoli to the blood capillaries in the lungs?
- A** diffusion
- B** evaporation
- C** secretion
- D** transpiration
- 8 What happens when the human body temperature drops below normal?

	arterioles near skin surface	sweat secreted
A	constrict	no
B	constrict	yes
C	dilate	no
D	dilate	yes

9 Which row is true of asexual reproduction?

	number of parents	offspring
A	1	genetically dissimilar
B	1	genetically identical
C	2	genetically dissimilar
D	2	genetically identical

10 What is a function of the stigma of a flower?

- A** to make female gametes
- B** to make male gametes
- C** to produce nectar to attract insects
- D** to secrete a sugary solution to aid the germination of pollen grains

11 In a plant, blue flower colour is dominant to red flower colour. A heterozygous blue-flowered plant is crossed with another heterozygous blue-flowered plant.

What are the expected proportions of the flower colour of the offspring?

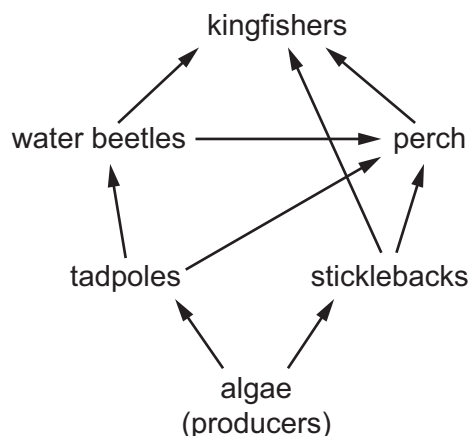
- A** 25% blue, 75% red
- B** 50% blue, 50% red
- C** 75% blue, 25% red
- D** 100% blue, 0% red

12 Cows have been bred to produce much greater yields of milk than cows from a century ago.

What is this an example of?

- A** artificial selection
- B** conservation
- C** inheritance
- D** natural selection

13 The diagram shows a food web.



Which of the animals are carnivores?

- A kingfishers only
 - B kingfishers, perch and water beetles
 - C perch and water beetles only
 - D tadpoles and sticklebacks
- 14 Pure copper chloride can be obtained from a mixture of powdered copper and solid copper chloride.

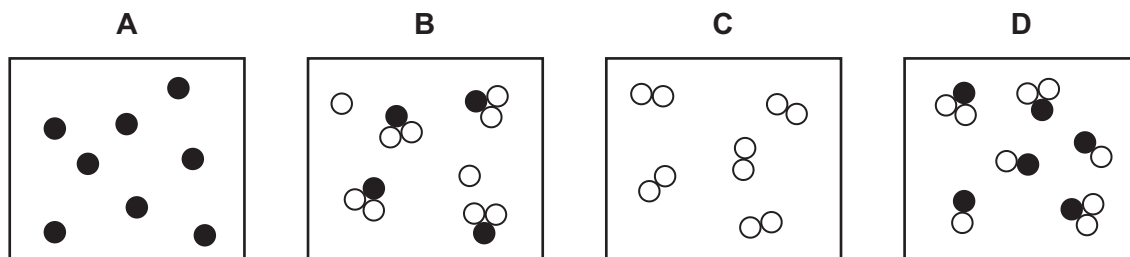
Three stages in the method are listed.

- P add water and stir
- Q crystallise
- R filter

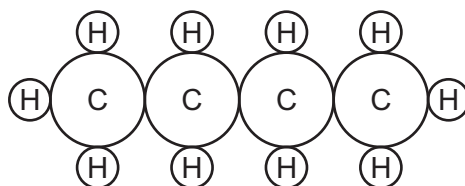
In which order are these stages carried out in order to obtain pure copper chloride from the mixture?

- A P → Q → R
- B P → R → Q
- C R → P → Q
- D R → Q → P

15 Which diagram represents a mixture of an element and a compound?



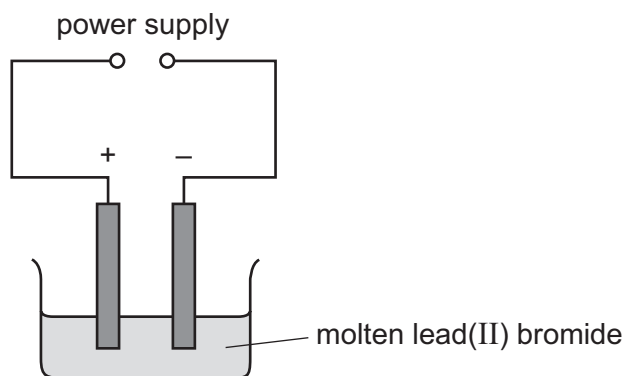
16 The diagram represents a molecule of butane.



What is the formula of butane?

- A** C_2H_5 **B** C_4H_8 **C** C_4H_{10} **D** $C_{10}H_4$

17 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

18 Which statement about electroplating iron with chromium is correct?

- A A catalyst is used.
- B The anode is chromium.
- C The electrolyte contains aqueous iron ions.
- D The electrolyte contains solid chromium ions.

19 Calcium carbonate reacts with dilute hydrochloric acid.

Equal masses of different-sized pieces of calcium carbonate are placed in four test-tubes, as shown.

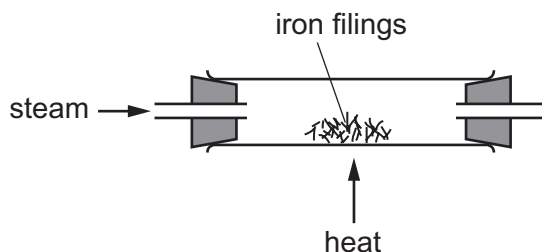
test-tube	1	2	3	4
size of calcium carbonate	medium pieces	powder	small pieces	large pieces

Equal volumes of the same concentration of dilute hydrochloric acid are added to each test-tube.

Which test-tube shows the lowest rate of reaction?

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

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



The equation for the reaction is shown.



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 Magnesium and hydrochloric acid react together.

What is the correct word equation?

- A magnesium + hydrochloric acid → magnesium chloride + hydrogen
- B magnesium + hydrochloric acid → magnesium chloride + hydrogen chloride
- C magnesium + hydrochloric acid → magnesium chloride + hydrogen + chlorine
- D magnesium + hydrochloric acid → magnesium chloride + hydrogen chloride + hydrogen

22 Some properties of elements are listed.

- 1 conduct electricity
- 2 form coloured compounds
- 3 high boiling point

What are the properties of a transition element?

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

23 Metal X reacts rapidly with steam but only very slowly with cold water.

What is X?

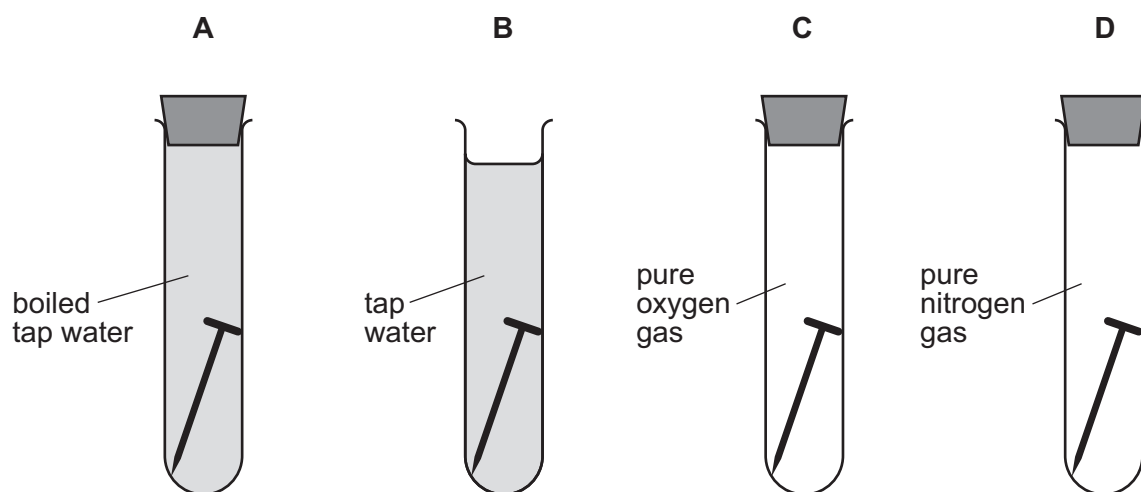
- A calcium
- B copper
- C magnesium
- D sodium

24 Which gas is **not** a common air pollutant?

- A water vapour
- B carbon monoxide
- C nitrogen dioxide
- D sulfur dioxide

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.



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.

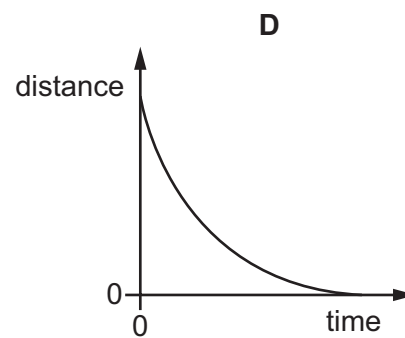
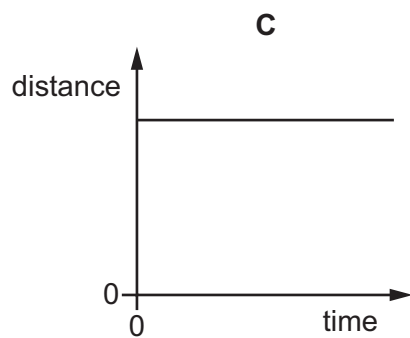
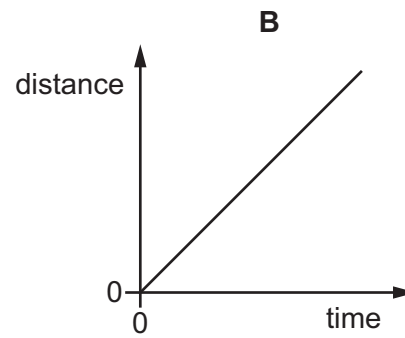
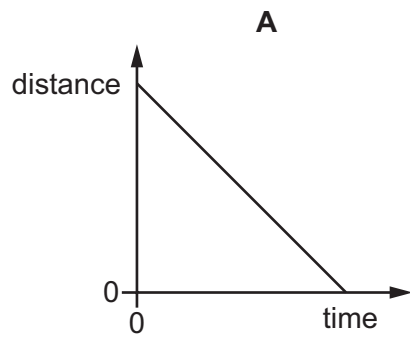
27 Ethene is used to make poly(ethene).

Which words describe ethene?

- 1 hydrocarbon
- 2 saturated
- 3 monomer

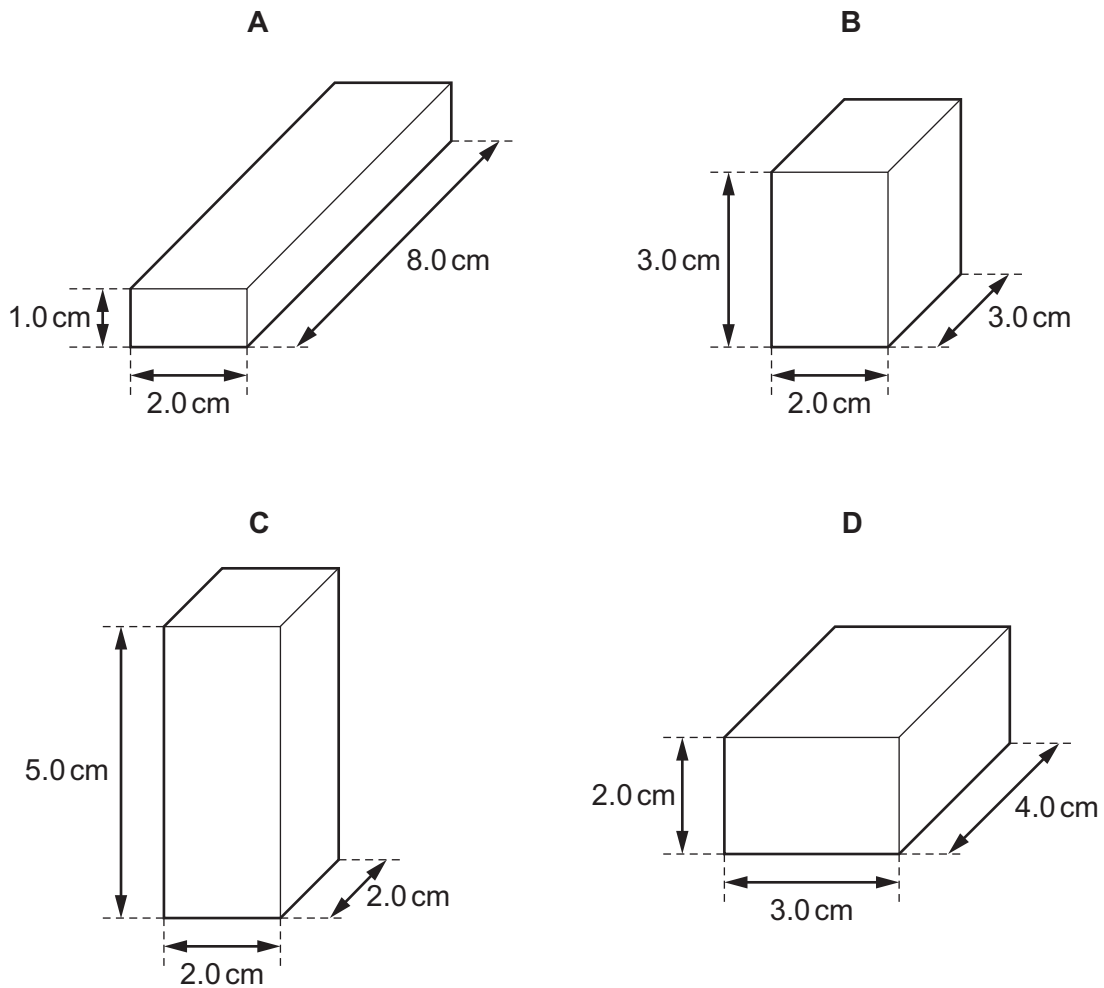
- A 1 and 2 only
- B 1 and 3 only
- C 2 and 3 only
- D 1, 2 and 3

28 Which distance-time graph represents a body moving with a changing speed?



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

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



30 A boy carries out an experiment to demonstrate pressure and its relationship to force and area.

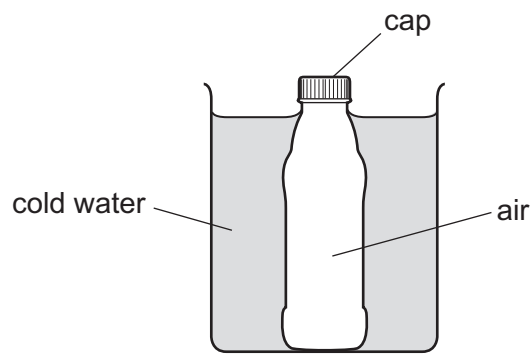
Which experiment produces the highest pressure on the classroom floor?

- A standing with one foot on the floor
- B standing with two feet on the floor
- C standing with one foot on the floor, holding a 5.0 kg mass
- D standing with two feet on the floor, holding a 5.0 kg mass

31 Which energy resource does **not** use a turbine and generator to produce electricity?

- A geothermal
- B nuclear fission
- C solar cells
- D wind

- 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.

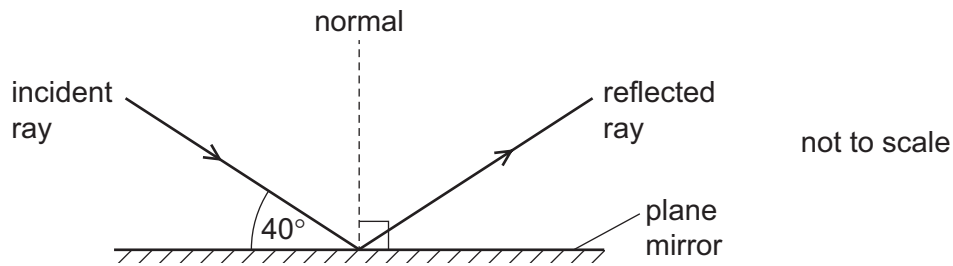
What remains the same during the cooling?

- 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 Which type of heat transfer is the main method in liquid water?
- A conduction
 - B convection
 - C evaporation
 - D radiation
- 34 A girl is sitting on a rock in the sea looking at passing waves. She notices that five complete wavelengths pass her in 20 s.

What is the frequency of this wave?

- A 0.25 Hz B 4.0 Hz C 15 Hz D 100 Hz

35 The diagram shows light hitting a plane mirror.



What is the angle of reflection?

- A** 40° **B** 50° **C** 80° **D** 100°

36 White light is dispersed by a glass prism into the colours of the spectrum.

Which colour of light is refracted the most and which is refracted the least?

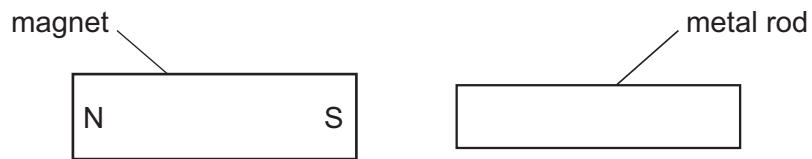
	refracted most	refracted least
A	green	red
B	red	green
C	red	violet
D	violet	red

37 The electromagnetic spectrum includes radio waves, infra-red and X-rays.

What is the correct sequence of these waves in order of increasing wavelength (smallest wavelength first)?

- A** infra-red, radio waves, X-rays
B infra-red, X-rays, radio waves
C X-rays, infra-red, radio waves
D X-rays, radio waves, infra-red

- 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 Which changes **both** result in an increase in the resistance of a metal wire?
- A decreasing the length and decreasing the diameter of the wire
 - B decreasing the length and increasing the diameter of the wire
 - C increasing the length and decreasing the diameter of the wire
 - D increasing the length and increasing the diameter of the wire

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cie.org.uk after the live examination series.

Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

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 —						

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.).