Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE **0653/12**

Paper 1 Multiple Choice (Core) **October/November 2017**

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.

1 Which characteristics help to define a living organism?

A diffusion, movement, respiration

B excretion, nutrition, sensitivity

C excretion, reproduction, transpiration

D growth, inspiration, nutrition

2 What is the correct description of diffusion?

A a controlled movement of molecules against a concentration gradient

B a controlled movement of molecules down a concentration gradient

C a random movement of molecules against a concentration gradient

D a random movement of molecules down a concentration gradient

3 What are enzymes made from?

A fat

B hormones

C protein

D starch

4 Which substances must be present in the diet to prevent weak bones and teeth?

A vitamin C and calcium

B vitamin C and iron

C vitamin D and calcium

D vitamin D and iron

5 Plants carry out a process called photosynthesis.

What is the word equation for photosynthesis?

A carbon dioxide + carbohydrates → oxygen + water

B carbon dioxide + water → oxygen + carbohydrates

C oxygen + carbohydrates → carbon dioxide + water

D oxygen + water → carbon dioxide + carbohydrates

6 In which order does food pass through parts of the alimentary canal?

A oesophagus → colon → small intestine

B small intestine → oesophagus → rectum

C small intestine → rectum → anus

D stomach → colon → small intestine

7 When we cut ourselves, blood comes out of the wound.

Which constituent of blood is most important in the formation of a blood clot?

A plasma

B platelets

C red blood cells

D white blood cells

8 Which statements about respiration are correct?

1 It breaks down nutrient molecules.

2 It is a chemical reaction.

3 It only occurs in animal cells.

4 It releases energy.

A 1, 2, 3 and 4

B 1, 2 and 4 only

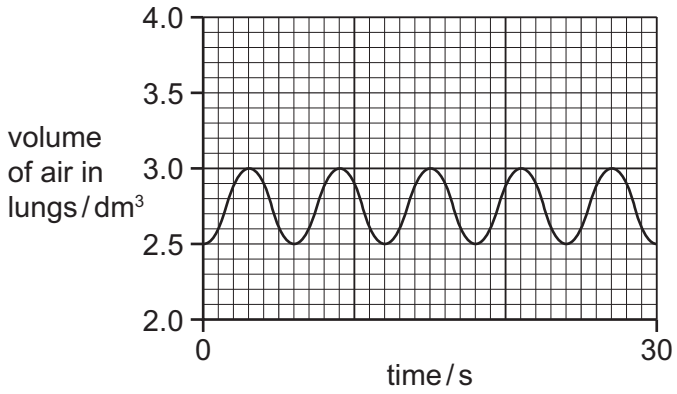
C 1 and 3 only

D 2, 3 and 4 only

9 The depth and rate of breathing can be measured by a spirometer, and recorded in the form of a graph.

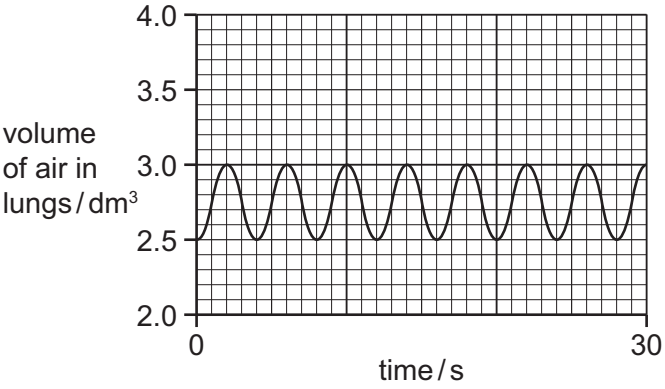
Graph X shows the depth and rate of breathing of a person at rest.

graph X



Which graph shows the depth and rate of breathing when the same person is running?

A



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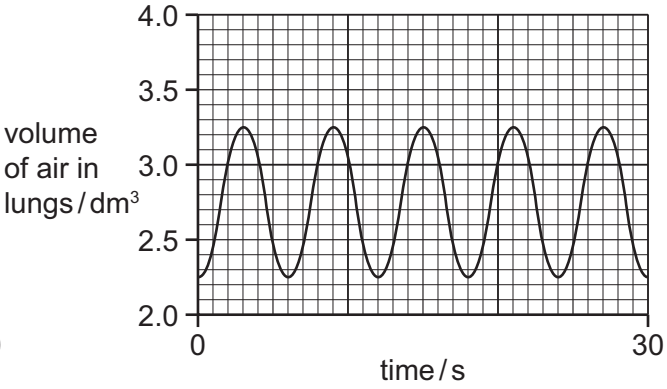

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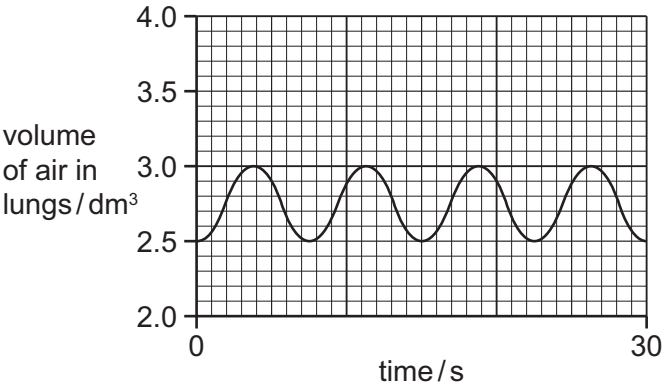
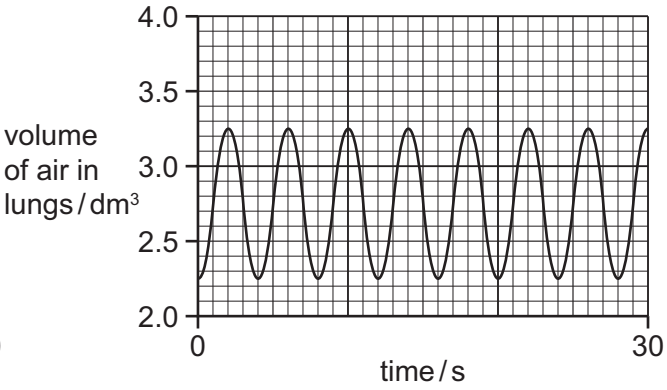


D

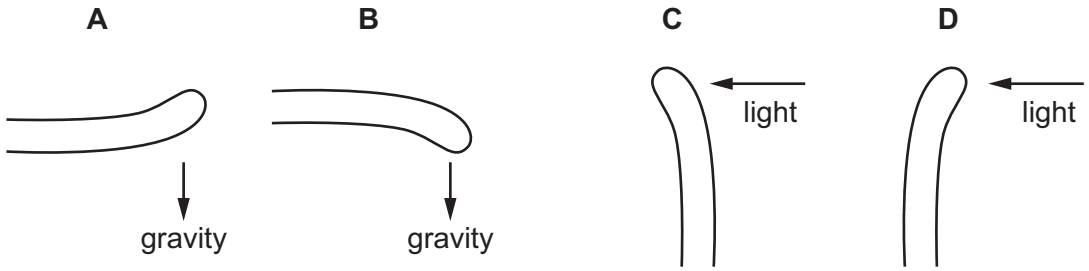


10 Which changes occur in an athlete just before the start of a race?

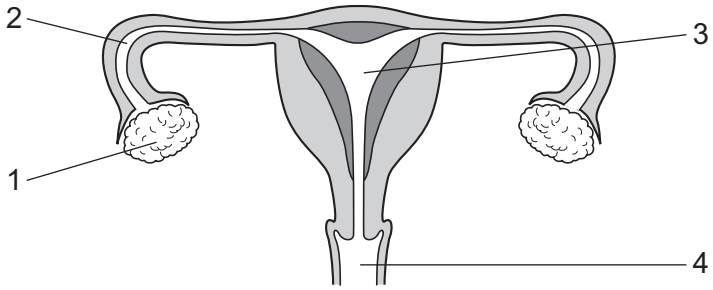
	adrenaline in the blood	glucose in the blood	pulse rate
A	decreases	decreases	increases
B	decreases	increases	decreases
C	increases	decreases	decreases
D	increases	increases	increases

11 The diagrams show shoots of maize seedlings.

Which shoot shows a geotropic response in which it grows away from the stimulus?



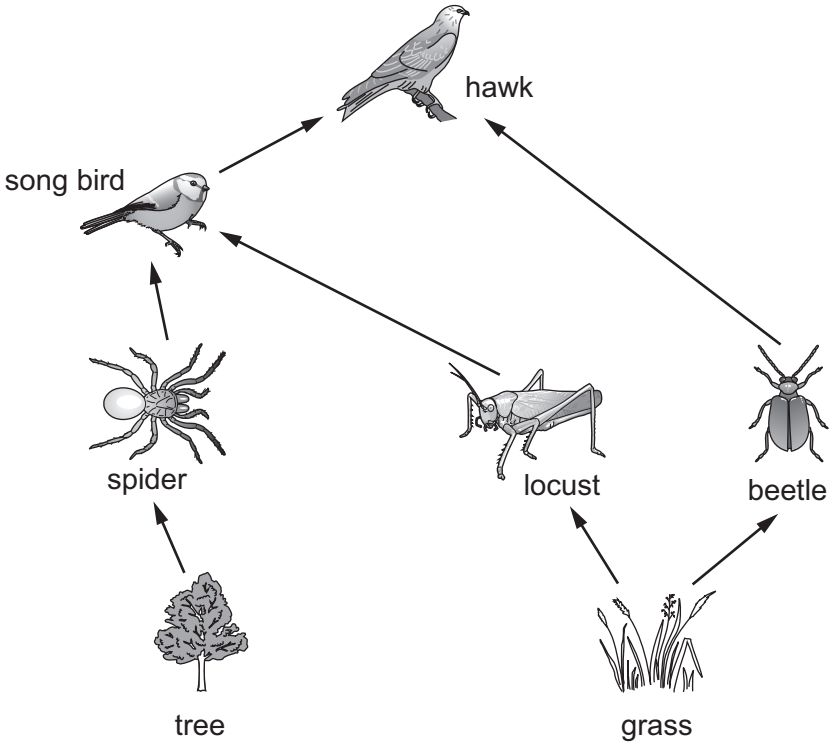
12 The diagram shows the female reproductive system.



Where are eggs produced and where does fertilisation occur?

	eggs produced	fertilisation occurs
A	1	2
B	1	4
C	3	2
D	3	4

13 The diagram shows a food web.



Which statement about this food web is correct?

A Some of the energy from the grass eventually passes to the hawk.

B The producers get their energy from the soil.

C There are more carnivores shown than herbivores.

D There are six consumers shown.

14 The formulae of three substances are shown.

substance	formula
methane	CH_4
water	H_2O
oxygen	O_2

Which statement is correct?

A Methane is made from five different types of atom.

B Methane, water and oxygen are molecules.

C Only methane and water are molecules.

D Oxygen is made from two different types of atom.

15 What is the correct sequence that takes place during fractional distillation?

A evaporate → condense → collect → heat

B evaporate → condense → heat → collect

C heat → condense → collect → evaporate

D heat → evaporate → condense → collect

16 What is a physical change?

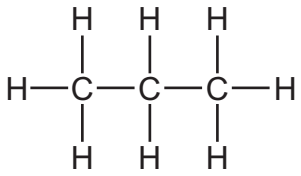
A carbon dioxide turning limewater milky

B the crystallisation of copper sulfate from solution

C the electrolysis of molten lead(II) bromide

D the thermal decomposition of calcium carbonate

17 The diagram represents a molecule of propane.



What is the formula of propane?

A C_2H_6 **B** C_2H_8 **C** C_3H_6 **D** C_3H_8

18 What is formed at the cathode during the electrolysis of aqueous copper chloride?

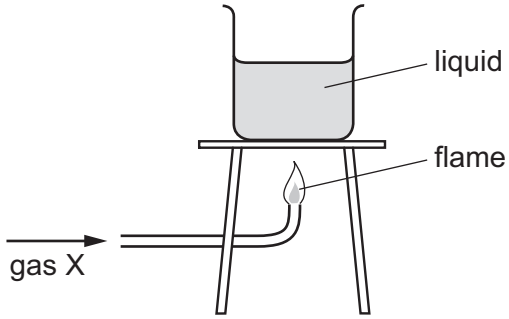
A chlorine

B copper

C hydrogen

D oxygen

19 The diagram shows gas X burning and heating a liquid.



Which row is correct?

	gas X	the burning of gas X is exothermic
A	hydrogen	✓
B	hydrogen	✗
C	oxygen	✓
D	oxygen	✗

20 The word equation for the reaction between hydrogen and copper oxide is shown.

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

Which substance, shown in the word equation, is reduced in the reaction?

A copper

B copper oxide

C hydrogen

D water

21 Lithium is added to water containing Universal Indicator.

A gas is given off and the indicator changes colour.

Which row describes the gas produced and the final colour of the indicator?

	gas produced	final colour of the indicator
A	hydrogen	blue
B	hydrogen	red
C	oxygen	blue
D	oxygen	red

22 A solution of compound X produces a dark green precipitate when aqueous sodium hydroxide is added.

What is X?

A copper(II) chloride

B copper(II) sulfate

C iron(II) sulfate

D iron(III) chloride

23 Which statement describes the elements in Period 3 of the Periodic Table?

A Metallic character decreases across the period.

B Metallic character decreases and then increases across the period.

C Metallic character increases across the period.

D Metallic character increases and then decreases across the period.

24 Which property is used to distinguish between metals and non-metals?

A boiling point

B colour

C density

D electrical conduction

[Turn over

25 Platinite is made by melting and mixing iron and nickel.

Which type of substance is platinite?

A alloy

B hydrocarbon

C ionic compound

D transition metal

26 P, Q, R and S are four gases found in clean air.

P is very unreactive.

Q makes up 21% of the air.

R makes up 78% of the air.

S is formed when fossil fuels are burned.

Which row is correct?

	P	Q	R	S
A	argon	nitrogen	oxygen	carbon dioxide
B	argon	oxygen	nitrogen	carbon dioxide
C	carbon dioxide	oxygen	nitrogen	argon
D	carbon dioxide	nitrogen	oxygen	argon

27 Which power stations burn fossil fuels?

1 a coal-fired power station

2 a nuclear power station

3 an oil-fired power station

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

28 A car travels at various speeds during a short journey.

The table shows the distances travelled and the times taken during each of four stages P, Q, R and S.

stage	P	Q	R	S
distance travelled / km	1.8	3.6	2.7	2.7
time taken / minutes	2.0	2.0	4.0	3.0

During which two stages is the car travelling at the same average speed?

A P and Q **B** P and S **C** Q and R **D** R and S

29 The table gives the volumes and masses of four objects.

Which object has the greatest density?

	mass / g	volume / cm^3
A	5.4	2.0
B	13	3.0
C	15	6.0
D	18	5.0

30 A force acting on an object causes some properties of the object to change.

Which list contains **only** properties that can be changed by the action of a force?

A mass, motion and shape

B mass, motion and size

C mass, shape and size

D motion, shape and size

31 The molecules in a substance are close together but free to change positions with each other.

Which substance at 20 °C matches this description?

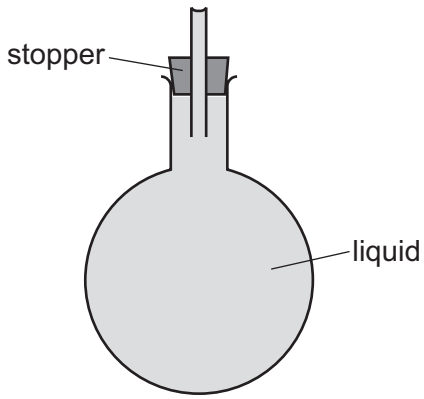
A air

B copper

C iron

D water

32 The diagram shows a glass flask with a stopper. A narrow glass tube passes through the stopper. The flask is full of a liquid.



The flask is heated. Some liquid flows out of the top of the tube.

Why does this happen?

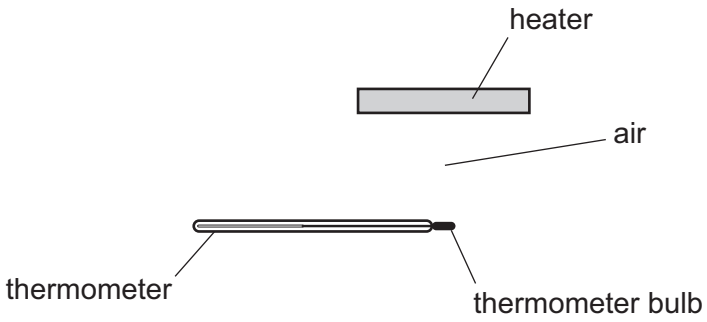
A The flask contracts.

B The flask expands.

C The liquid contracts.

D The liquid expands.

33 The diagram shows a heater above a thermometer. The thermometer bulb is in the position shown.



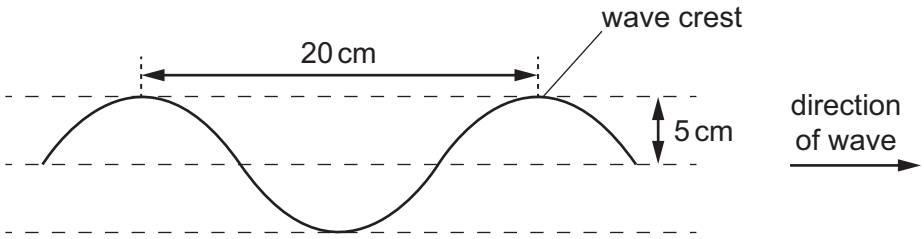
Which row shows how the heat energy from the heater reaches the thermometer bulb?

	conduction	convection	radiation
A	no	no	yes
B	no	yes	no
C	no	yes	yes
D	yes	yes	no

34 The diagram shows a section of a rope.

Four wave crests pass a point on the rope every second.

Each wave crest travels 80 cm in one second.



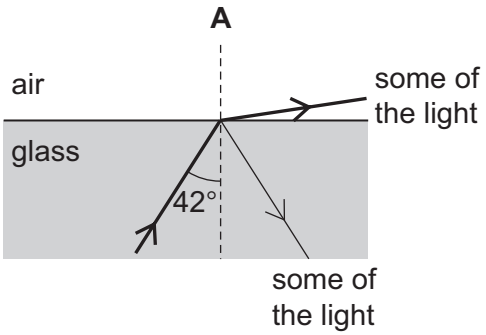
What is the speed of the wave?

A 4.0 cm / s **B** 5.0 cm / s **C** 20 cm / s **D** 80 cm / s

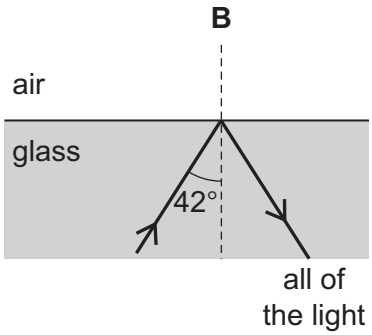
35 A ray of light travels in glass towards air. The critical angle for the glass is 43°.

Which diagram shows what happens to the ray of light?

A



B



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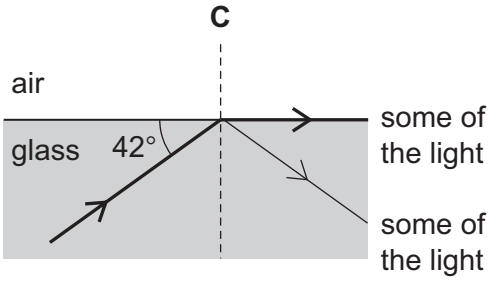
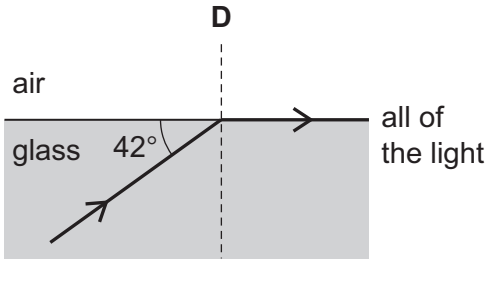


D



36 Electromagnetic waves are used to scan passengers' luggage before they board an aeroplane.

Electromagnetic waves are also used in a television remote controller.

Which type of electromagnetic wave is used for each of these purposes?

	scanning luggage	television remote controller
A	radio waves	infra-red waves
B	radio waves	ultraviolet waves
C	X-rays	infra-red waves
D	X-rays	ultraviolet waves

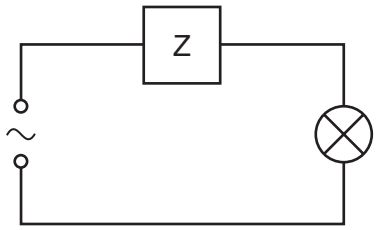
37 A man stands 1.20 km away from a cliff. The man fires a gun. A timer starts as the gun is fired.

The timer stops when it detects the echo of the sound of the gun from the cliff. The time shown on the timer is 7.50 s.

What value does this give for the speed of sound in air?

A 160 m / s **B** 320 m / s **C** 330 m / s **D** 640 m / s

38 The device Z in this circuit is designed to cut off the electricity supply **automatically** if too much current flows.



What is device Z?

A a fuse

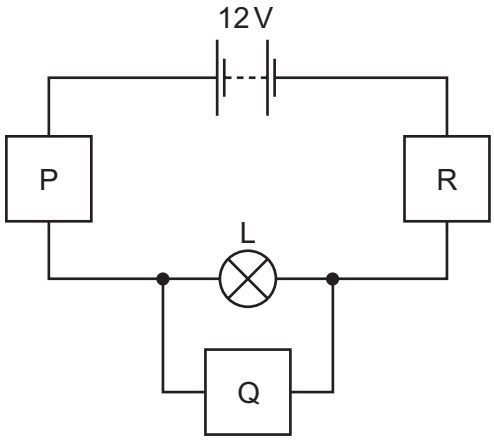
B a resistor

C a switch

D an ammeter

39 The diagram shows a circuit used to find the resistance of lamp L.

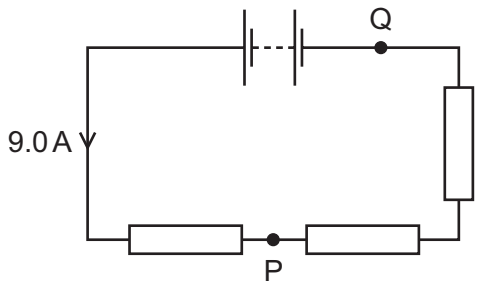
Blocks P, Q and R represent the different components used.



Which is a possible choice of components to use for P, Q and R?

	P	Q	R
A	ammeter	variable resistor	voltmeter
B	variable resistor	voltmeter	ammeter
C	voltmeter	ammeter	variable resistor
D	voltmeter	variable resistor	ammeter

40 A circuit contains a battery and three identical resistors. The current at one point in the circuit is 9.0 A, as shown. P and Q are points in the connecting wires.



What is the current at point P and what is the current at point Q?

	current at P / A	current at Q / A
A	3.0	3.0
B	6.0	0
C	6.0	9.0
D	9.0	9.0

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.).