GradeMax

Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/22**

Paper 2 Multiple Choice (Extended) **October/November 2025**

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)

4587131232

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.
- Take the weight of 1.0 kg to be 9.8 N (acceleration of free fall = 9.8 m / s^2).

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.

This document has **16** pages. Any blank pages are indicated.

© UCLES 2025

GradeMax

1 Four biological processes are listed.

1 egestion

2 excretion

3 nutrition

4 respiration

Which processes are characteristics of all living organisms?

A 1, 2, 3 and 4

B 1, 2 and 3 only

C 1, 2 and 4 only

D 2, 3 and 4 only

2 What are features of a palisade mesophyll cell?

1 a nucleus

2 a cell wall

3 chloroplasts

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

3 Which process is described as the net movement of water molecules from a dilute solution to a concentrated solution through a partially permeable membrane?

A absorption

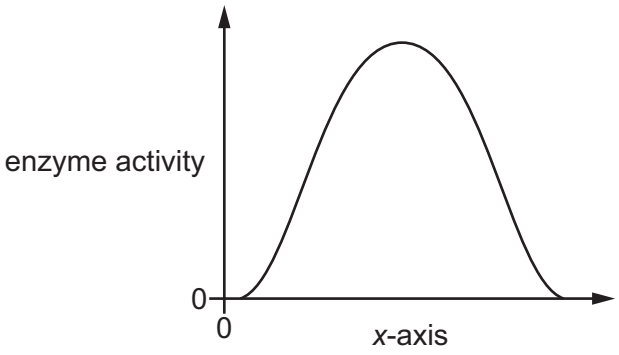
B evaporation

C osmosis

D transpiration

© UCLES 2025

4 The graph shows how the activity of an enzyme varies.



What is the *x*-axis label for this graph?

A enzyme activity

B pH

C temperature

D time

5 Which statement about photosynthesis is correct?

A Chlorophyll transfers energy from light into energy in chemicals for the synthesis of carbohydrates.

B Chlorophyll transfers energy from light into energy in chemicals for the synthesis of carbon dioxide.

C Mitochondria transfer energy from light into energy in chemicals for the synthesis of carbohydrates.

D Mitochondria transfer energy from light into energy in chemicals for the synthesis of carbon dioxide.

6 Some nutrients that a football player eats before a match are listed.

1 carbohydrates

2 calcium

3 fats

4 proteins

Which nutrients provide the football player with the most energy per 100 g during the match?

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

© UCLES 2025

GradeMax

7 Which description of physical digestion is correct?

A the breakdown of food into smaller pieces with a chemical change to the food molecules

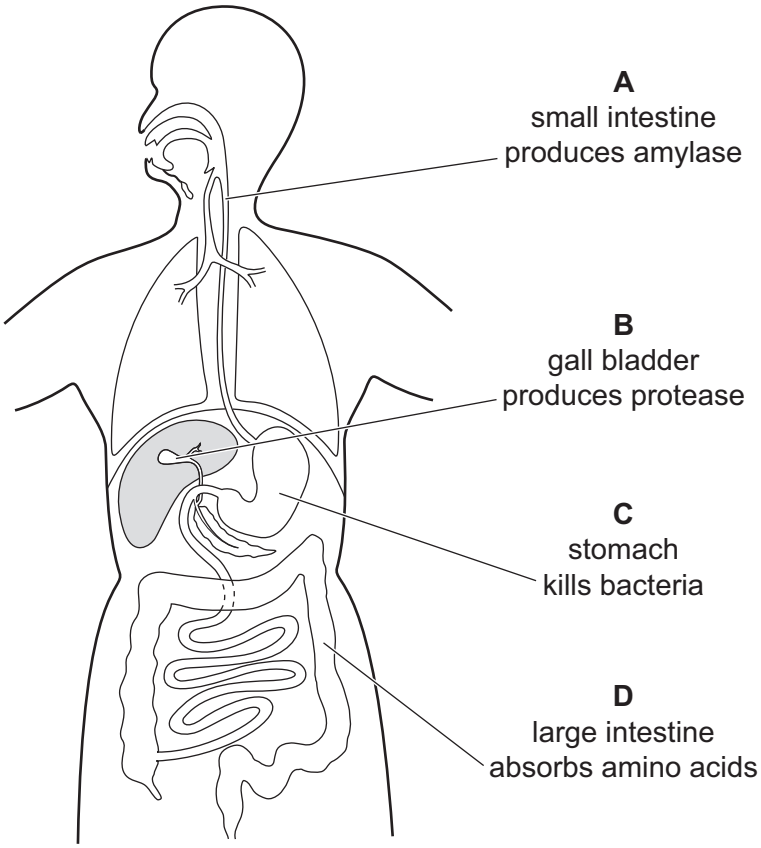
B the breakdown of food into smaller pieces without a chemical change to the food molecules

C the breakdown of large insoluble food molecules into small soluble food molecules

D the breakdown of large soluble food molecules into small soluble food molecules

8 The diagram shows the alimentary canal and associated organs.

Which structure has the correct name and function?



9 Which type of plant cell has a large surface area to increase the uptake of water?

A mesophyll

B root cortex

C root hair

D xylem

© UCLES 2025

GradeMax

10 Which factors are possible risk factors for coronary heart disease?

1 age

2 genetic predisposition

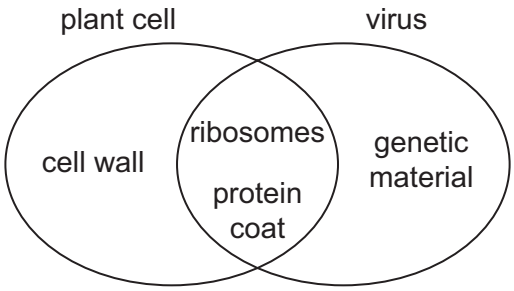
3 sex

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

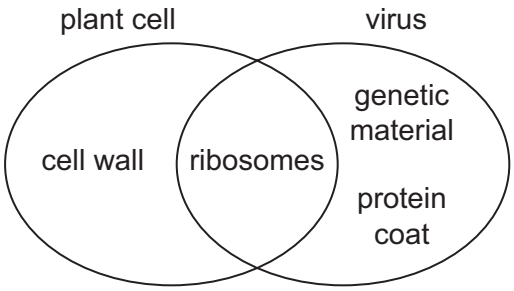
11 The diagrams show features of plant cells and viruses that are different and features that are common to both.

Which diagram is correct?

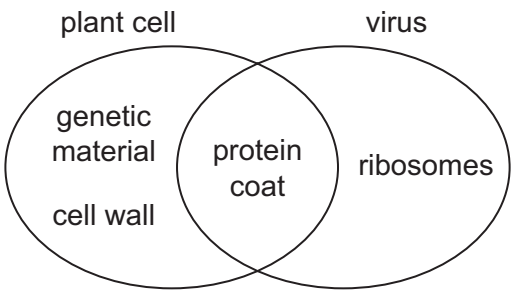
A



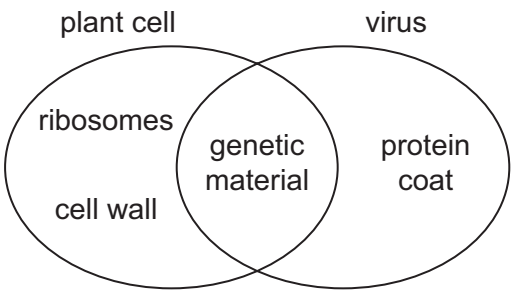
B



C



D



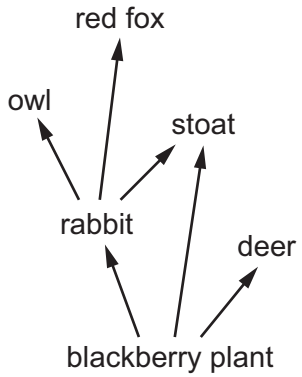
12 What happens to breathing in humans during exercise?

	depth of breathing	rate of breathing
A	increases	increases
B	increases	no change
C	no change	increases
D	no change	no change

© UCLES 2025

[Turn over

13 The diagram shows a food web.



Which statement about this food web is correct?

A There is one producer and two secondary consumers.

B There are two producers and three secondary consumers.

C There are two secondary consumers and two tertiary consumers.

D There are three primary consumers and three secondary consumers.

14 The melting point of argon is –189 °C and its boiling point is –185 °C.

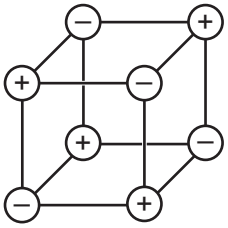
The temperature of a sample of argon is changed from –180 °C to –187 °C.

Which row describes the arrangement of the particles at –180 °C and at –187 °C?

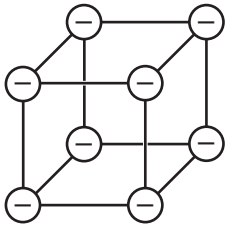
	particles at –180 °C	particles at –187 °C
A	far apart and randomly arranged	close together and randomly arranged
B	far apart and randomly arranged	close together and ordered
C	close together and ordered	close together and randomly arranged
D	close together and ordered	far apart and randomly arranged

15 Which diagram represents the lattice structure of sodium chloride?

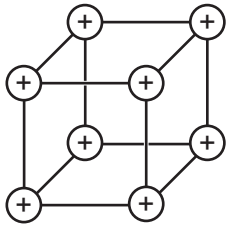
A



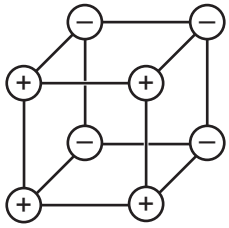
B



C



D



16 In which molecule are 10 electrons used to form covalent bonds?

A C_2H_4 **B** CH_3OH **C** CO_2 **D** N_2

17 The formula of an iron(III) ion is Fe^{3+}.

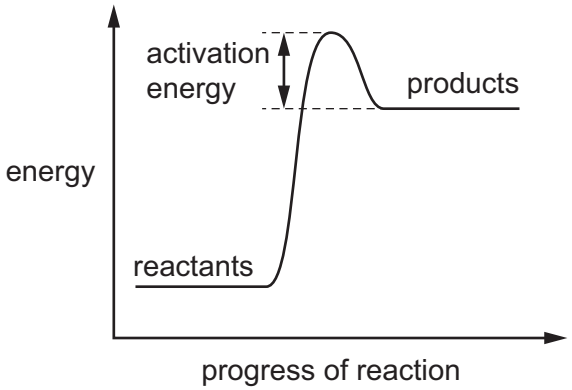
The formula of a sulfate ion is SO_4^{2-}.

What is the formula of iron(III) sulfate?

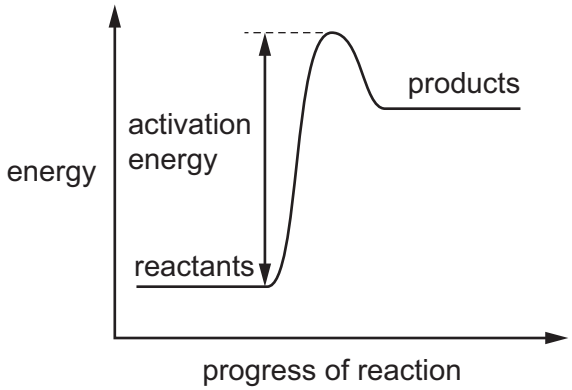
A $FeSO_4$ **B** Fe_3SO_4 **C** $Fe_2(SO_4)_3$ **D** $Fe_3(SO_4)_2$

18 Which reaction pathway diagram shows the activation energy for an exothermic reaction?

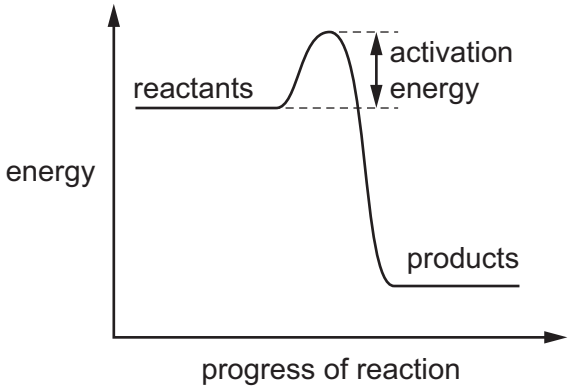
A



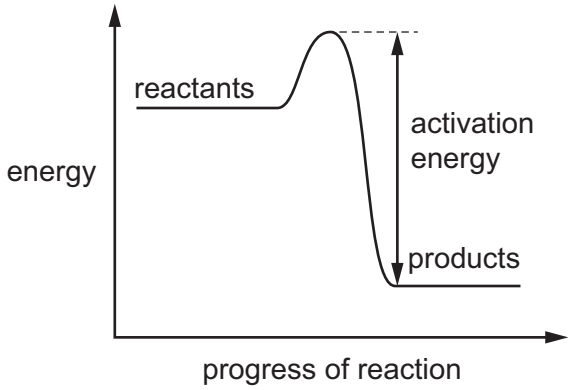
B



C

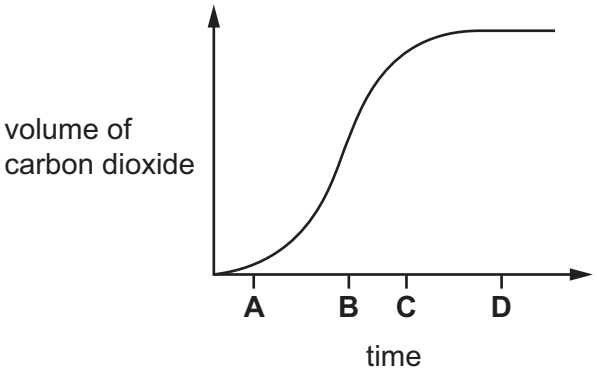


D



19 The graph shows the volume of carbon dioxide produced in a reaction.

At which time is the rate of reaction greatest?



GradeMax

20 Ammonia dissolves in water.

Which test shows that the solution has a pH of 9?

A Blue litmus paper stays blue.

B Red litmus paper turns blue.

C Universal indicator turns green.

D Universal indicator turns blue.

21 What is the method by which elements are arranged in the Periodic Table?

A by nucleon number

B by number of electrons

C by number of neutrons

D by number of protons

22 Which statement about Group I elements is correct?

A Lithium and potassium are poor electrical conductors.

B Potassium has a higher density than lithium.

C Sodium and potassium are relatively hard metals.

D Sodium reacts with water to produce a lilac flame.

23 Which mixture results in the displacement of a halogen?

A Br_2(aq) and NaCl(aq)

B Cl_2(g) and KI(aq)

C I_2(aq) and KBr(aq)

D NaBr(aq) and KCl(aq)

24 What is **not** a property of transition elements?

A form coloured compounds

B good electrical conductivity

C high melting point

D low density

© UCLES 2025

25 How is an R_f value calculated in chromatography?

A $\dfrac{\text{distance travelled by substance}}{\text{distance travelled by solvent}}$

B $\dfrac{\text{distance travelled by solvent}}{\text{distance travelled by substance}}$

C $\dfrac{\text{distance from the baseline to the top of the paper}}{\text{distance travelled by substance}}$

D $\dfrac{\text{distance travelled by substance}}{\text{distance from the baseline to the top of the paper}}$

26 Which method describes how pure crystals of magnesium sulfate are obtained from pure aqueous magnesium sulfate?

A Filter the crystals from the solution and dry them between pieces of filter paper.

B Filter the crystals from the solution and heat them to dryness.

C Heat to dryness and leave to cool.

D Heat to remove some of the water and leave to cool and evaporate slowly.

27 Four statements about alkenes are listed.

1 They turn aqueous bromine from colourless to orange.

2 They are reactants in addition reactions.

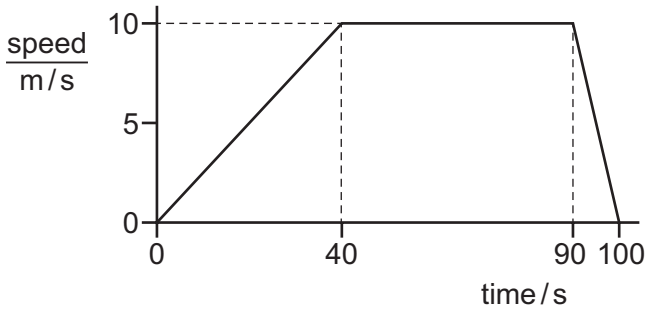
3 They react with steam in the presence of an acid catalyst.

4 They react with hydrogen without a catalyst.

Which statements are correct?

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

28 The speed–time graph for the motion of a car is shown.



What is the distance the car travels while it is decelerating?

A 50 m **B** 100 m **C** 200 m **D** 500 m

GradeMax

29 A force of 2.0 N moves an object a distance of 40 cm in the direction of the force.

What is the work done by the force?

A 0.20 J **B** 0.80 J **C** 5.0 J **D** 80 J

30 A chair has a weight of 80 N.

The chair has four legs, and each leg has a base area of 20 cm^2.

What is the pressure exerted by the chair on the floor?

A 1.0 Pa **B** 4.0 Pa **C** 10 000 Pa **D** 40 000 Pa

31 Which statement is a reason why metals are better thermal conductors than plastics?

A Metals contain delocalised electrons.

B Metals have high melting points.

C The forces between particles in metals are strong.

D The particles in metals are far apart.

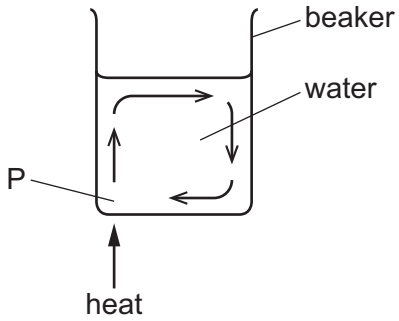
32 A beaker of water is placed in front of an electric fan.

Which changes to the temperature of the water and the position of the beaker **both** result in a greater rate of evaporation of water from the beaker?

	temperature of water	position of beaker
A	decrease	further away from fan
B	decrease	nearer to fan
C	increase	further away from fan
D	increase	nearer to fan

© UCLES 2025

33 A beaker of water is heated, and a convection current is formed in the water as shown in the diagram.



What happens to the water at point P?

A Its volume increases and its density decreases.

B Its volume increases and its density increases.

C Its volume remains the same and its density decreases.

D Its volume remains the same and its density increases.

34 An image of an object is formed by a plane mirror.

Which row describes the characteristics of the image?

	type of image	size of image
A	real	same as object
B	real	smaller than object
C	virtual	same as object
D	virtual	smaller than object

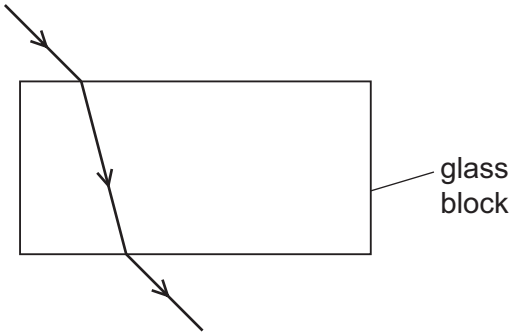
© UCLES 2025

GradeMax

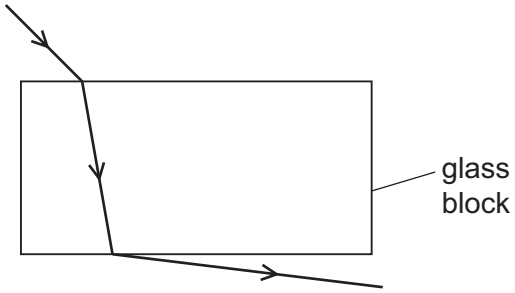
35 Light passes through a glass block.

Which diagram shows the path taken by the light?

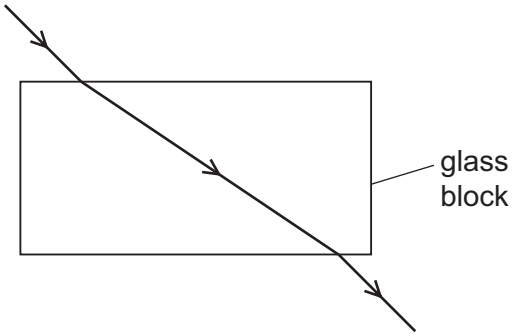
A



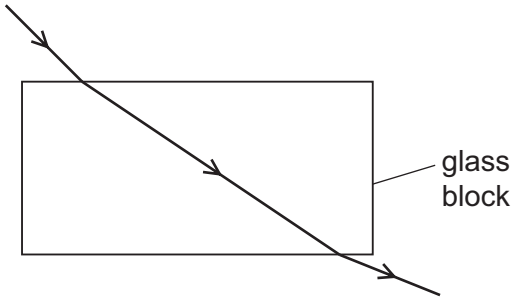
B



C



D



36 What is the speed of ultraviolet radiation in a vacuum?

A $3.0 \times 10^{4}\,\text{m/s}$

B $3.0 \times 10^{6}\,\text{m/s}$

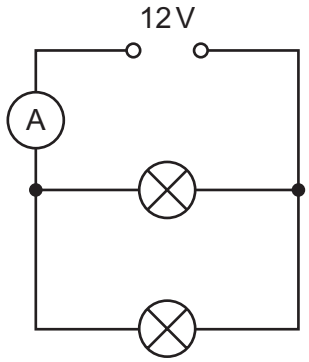
C $3.0 \times 10^{8}\,\text{m/s}$

D $3.0 \times 10^{10}\,\text{m/s}$

© UCLES 2025

GradeMax

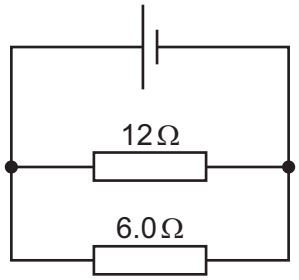
37 The circuit shows two identical lamps connected in parallel to a 12 V power supply. The reading on the ammeter is 3.0 A.



What is the power transferred by **each** lamp?

A 4.0 W **B** 8.0 W **C** 18 W **D** 36 W

38 The circuit shown contains a 12 Ω resistor and a 6.0 Ω resistor connected in parallel.



What is the combined resistance of the two resistors?

A 0.25 Ω **B** 4.0 Ω **C** 9.0 Ω **D** 18 Ω

39 What is the purpose of a fuse in an electric circuit?

A It acts as an extra resistor in the circuit.

B It keeps the current at a steady value.

C It keeps the voltage at a steady value.

D It protects the circuit from a current that is too large.

40 Which object is a dwarf planet?

A Mars

B Mercury

C Jupiter

D Pluto

© UCLES 2025

GradeMax

BLANK PAGE

GradeMax

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 Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

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

© UCLES 2025

© UCLES 2025

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.).

GradeMax