CAMBRIDGE
International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/23**

Paper 2 Multiple Choice (Extended) **May/June 2026**

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)

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 or tape.
- 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.

1 An animal cell is placed in a solution with a water potential lower than its cytoplasm.

Which statement describes the movement of water across the cell membrane?

A equal movement in and out of the cell

B net movement into the cell

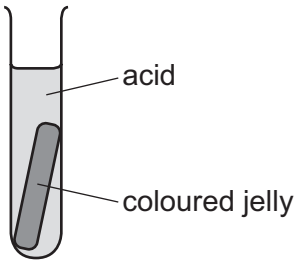
C net movement out of the cell

D no movement in or out of the cell

2 A student investigates diffusion.

The student adds some acid to a boiling tube containing some coloured jelly. As the acid diffuses into the jelly, the jelly changes colour.

The diagram shows the apparatus used.



The student can alter the investigation in different ways.

1 by changing the concentration of the acid

2 by changing the surface area of the jelly

3 by changing the temperature of the acid

Which changes will alter the rate at which the whole of the jelly changes colour?

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

3 1 cm^3 of substance X is added to 10 cm^3 of starch suspension and mixed. Food tests are carried out immediately after mixing and again after an hour.

The results of the tests are shown in the table.

test reagent	colour of solution after mixing	colour of solution after one hour
Benedict's solution	blue	orange
iodine solution	blue-black	brown

What is substance X?

A amylase

B protease

C lipase

D reducing sugar

4 Which effects on enzyme activity are caused by a large change in pH away from the optimum pH?

1 denaturation of the protein structure

2 increased kinetic energy of the enzyme and substrate

3 the substrate no longer fits into the active site

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

5 The diagram shows a section through the lower epidermis of a leaf.

Which description of the diagram is correct?

A There are chloroplasts in the stomata, but **not** in the guard cells.

B There are four stomata and four epidermal cells.

C There are two stomata and four guard cells.

D There is a cuticle that covers the epidermal cells and stomata.

6 Which two components of a balanced diet provide energy for the body?

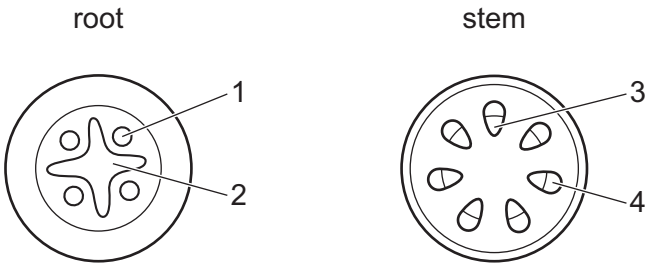
A fats and water

B oils and carbohydrates

C protein and calcium

D vitamin D and fibre

7 The diagram shows a section through a root and a stem.



Which row identifies the phloem in the root and the stem?

	root	stem
A	1	3
B	1	4
C	2	3
D	2	4

8 Which statement describes the way that the heart works?

A Arteries and veins contract, and valves ensure the one-way flow of blood.

B Arteries and veins contract, and valves ensure the two-way flow of blood.

C Atria and ventricles contract, and valves ensure the one-way flow of blood.

D Atria and ventricles contract, and valves ensure the two-way flow of blood.

9 Which feature of red blood cells allows them to transport oxygen?

A contain haemoglobin

B large size

C surface hairs

D thick cell membrane

10 Which features are needed in the gas exchange surface in humans?

A a large surface area and a thick surface

B a large surface area and a thin surface

C a small surface area and a thick surface

D a small surface area and a thin surface

11 What is a balanced symbol equation for aerobic respiration?

A $C_3H_{12}O_6 + 6O_2 \rightarrow 3CO_2 + 6H_2O$

B $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

C $3CO_2 + 6H_2O \rightarrow C_3H_{12}O_6 + 6O_2$

D $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

12 During pollination, pollen grains are transferred from

A anther to ovule.

B anther to stigma.

C stigma to anther.

D stigma to ovule.

13 There are less than 100 Wollemi pine trees remaining in the wild.

Which techniques would be useful to preserve the Wollemi pine trees and increase their numbers?

1 educating the public

2 increasing livestock production

3 protecting the habitat

4 creating a seed bank

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

14 Which statement about the Periodic Table is correct?

A The proton number decreases across a period.

B The number of outer-shell electrons stays the same across a period.

C The number of occupied electron shells increases down a group.

D The number of outer-shell electrons decreases down a group.

15 Which statement about the attractive forces in compounds is correct?

A Covalent compounds have strong bonds between atoms and strong attractive forces between molecules.

B Covalent compounds have weak bonds between atoms and weak attractive forces between molecules.

C Ionic compounds have strong attractive forces between ions with the same charge.

D Ionic compounds have strong attractive forces between positive and negative ions.

16 Which statement about electrolysis is **not** correct?

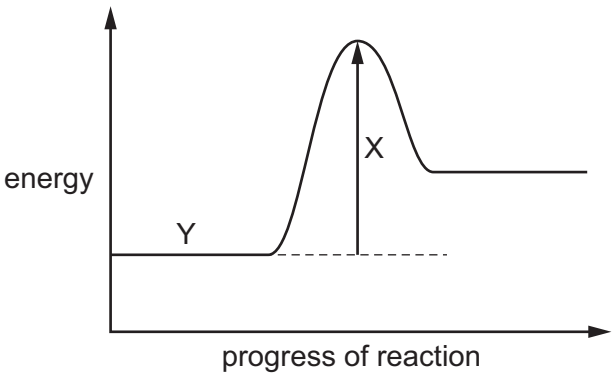
A Electrolysis is the breakdown of covalent compounds.

B Lead forms at the cathode during the electrolysis of molten lead(II) bromide.

C Platinum can be used to make inert electrodes.

D The positive electrode is called the anode.

17 A reaction pathway diagram for a chemical reaction is shown.



Which row identifies the type of reaction and the labels X and Y?

	type of reaction	X	Y
A	endothermic	activation energy	reactants
B	endothermic	overall energy change	products
C	exothermic	activation energy	reactants
D	exothermic	overall energy change	products

18 Which equations represent a redox reaction?

1 $Ag^+ + Cl^- \rightarrow AgCl$

2 $Mg + H_2O \rightarrow MgO + H_2$

3 $C + CO_2 \rightarrow 2CO$

4 ethene $\rightarrow$ poly(ethene)

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

19 Aqueous chlorine, aqueous bromine and aqueous iodine are added separately to aqueous potassium iodide.

Which row shows the correct observations?

	addition of Cl_2(aq)	**addition of Br_2(aq)**	**addition of I_2(aq)**
A	brown solution	brown solution	brown solution
B	no visible reaction	brown solution	yellow solution
C	brown solution	yellow solution	brown solution
D	no visible reaction	yellow solution	brown solution

20 Which substance is used as a raw material in the blast furnace?

A argon

B iron

C coke

D methane

21 Group I elements react with Group VII elements.

Which compound is formed by the most vigorous reaction?

A LiF **B** LiI **C** RbF **D** RbI

22 Which statements about carbon dioxide are correct?

1 It is a product of the complete combustion of fossil fuels.

2 It is a product of the reduction of iron(III) oxide by carbon monoxide.

3 It is a product of the reaction between an acid and a carbonate.

4 It contains single carbon–oxygen covalent bonds.

A 1, 2, 3 and 4

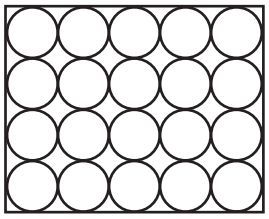
B 1, 2 and 3 only

C 1 and 4 only

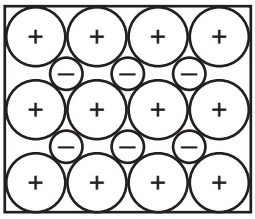
D 2 and 3 only

23 Which diagram shows the arrangement of atoms in an alloy?

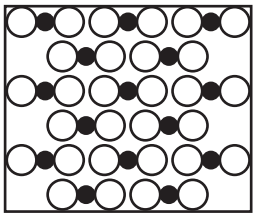
A



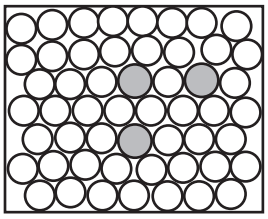
B



C



D



24 Which conditions are used in the cracking of long chain alkanes?

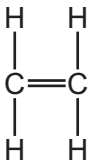
A high temperature and a catalyst

B high temperature and a low pressure

C low pressure and a catalyst

D low temperature and a high pressure

25 The structure of a compound is shown.



Which statement about the compound is correct?

A It forms an addition polymer.

B It is an alkane.

C It is a saturated hydrocarbon.

D It turns aqueous bromine orange.

26 Excess copper(II) oxide reacts with dilute sulfuric acid to produce aqueous copper(II) sulfate.

Which process results in pure crystals of copper(II) sulfate?

A crystallising the reaction mixture

B filtering and then crystallising the filtrate

C filtering and then drying the residue

D simple distillation of the reaction mixture

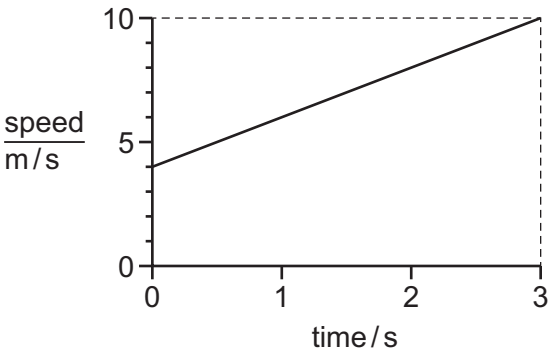
27 The results of tests carried out on four solutions, P, Q, R and S, are shown.

	acidify with dilute nitric acid, then add aqueous silver nitrate	**add aqueous sodium hydroxide**	**acidify with dilute nitric acid, then add aqueous barium nitrate**
P	yellow precipitate	white precipitate	no reaction
Q	cream precipitate	light blue precipitate	no reaction
R	white precipitate	white precipitate which is soluble in excess	no reaction
S	no reaction	red-brown precipitate	white precipitate

Which row gives the identities of the four solutions?

	P	**Q**	**R**	**S**
A	CaI_2	$CuBr_2$	$ZnBr_2$	$CuSO_4$
B	$CaCl_2$	$FeBr_2$	$ZnCl_2$	$Fe_2(SO_4)_3$
C	ZnI_2	$FeSO_4$	$CaCl_2$	$CaBr_2$
D	CaI_2	$CuBr_2$	$ZnCl_2$	$Fe_2(SO_4)_3$

28 The diagram shows a speed–time graph for an object.



What is the average speed of the object?

A 2.0 m / s **B** 4.0 m / s **C** 7.0 m / s **D** 10 m / s

29 An athlete of mass 62 kg jumps a vertical height of 1.25 m.

As he moves upwards, all his initial kinetic energy is transferred to gravitational potential energy.

The gravitational field strength g is 9.8 N / kg.

What is the initial speed of the athlete?

A 2.5 m / s **B** 3.5 m / s **C** 4.9 m / s **D** 12.4 m / s

30 Which statement about mass and weight is correct?

A Mass and weight are both forces.

B Mass is a force and weight is **not** a force.

C Mass is **not** a force and weight is **not** a force.

D Weight is a force and mass is **not** a force.

31 The air above a hot surface rises.

What is the name of this process?

A concentration

B condensation

C conduction

D convection

32 Which surface is the best emitter of thermal radiation?

A dull black surface

B dull white surface

C shiny black surface

D shiny white surface

33 A water wave travels across the surface of a pond.

Which term is defined as the number of waves that pass a point in one second?

A the amplitude of the wave

B the frequency of the wave

C the speed of the wave

D the wavelength of the wave

34 Which statement about the speed of electromagnetic waves in a vacuum is correct?

A All electromagnetic waves travel at $3.0 \times 10^8\,\text{m/s}$.

B Only visible light travels at $3.0 \times 10^8\,\text{m/s}$.

C Radio waves travel more slowly than $3.0 \times 10^8\,\text{m/s}$.

D Ultraviolet rays travel more quickly than $3.0 \times 10^8\,\text{m/s}$.

35 A student stands near a railway track at a station. A train travels towards the student at the station.

The student hears the track vibrating before she hears the sound of the train through the air.

Which statement explains this?

A Sound waves reflect off the track.

B Sound waves refract when travelling through the track.

C Sound waves travel faster in solids than in gases.

D Sound waves travel slower in solids than in gases.

36 What are characteristics of the image formed by a vertical plane mirror?

A real and enlarged

B real and laterally inverted

C virtual and enlarged

D virtual and laterally inverted

37 There is a current of 20 mA in a resistor for a time *t*.

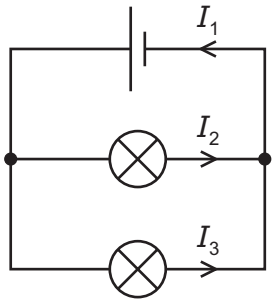
During this time, a charge of 600 C passes through the resistor.

What is the value of *t*?

A $3.3 \times 10^{-5}\,\text{s}$ **B** $12\,\text{s}$ **C** $30\,\text{s}$ **D** $3.0 \times 10^4\,\text{s}$

38 In the circuit shown, the two lamps are identical.

The currents at three points in the circuit are labelled I_1, I_2 and I_3.



Which relationship is correct?

A $I_1 > I_2$ **B** $I_2 > I_1$ **C** $I_3 > I_1$ **D** $I_3 = I_1$

39 A student makes an incorrect statement about the Big Bang Theory.

The incorrect statement is:

'The Universe expanded from a single point of low density and high temperature.'

Which statement identifies the error?

A The Universe contracted.

B The Universe expanded from multiple points.

C The single point was of high density.

D The single point was of low temperature.

40 The Earth orbits the Sun at a distance of 150 000 000 km in 365 days at a speed of 30 km / s.

Planet X orbits the Sun at a distance of 780 000 000 km in 4300 days.

What is the value of the orbital speed of planet X?

A 5.0 km / s **B** 7.0 km / s **C** 13 km / s **D** 24 km / s

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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 –	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.).