Cambridge Assessment International Education

Cambridge IGCSE™

CO-ORDINATED SCIENCES **0654/13**

Paper 1 Multiple Choice (Core) **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)

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.

1 Which part of a plant cell allows the movement of substances into and out of the cell?

A cell membrane

B cell wall

C nucleus

D vacuole

2 Which row matches the nutrient to the chemical elements that it contains?

	nutrient	carbon	hydrogen	oxygen	nitrogen
A	fat	✓	✓	✗	✗
B	protein	✓	✓	✓	✓
C	starch	✓	✗	✓	✓
D	glucose	✗	✓	✓	✓

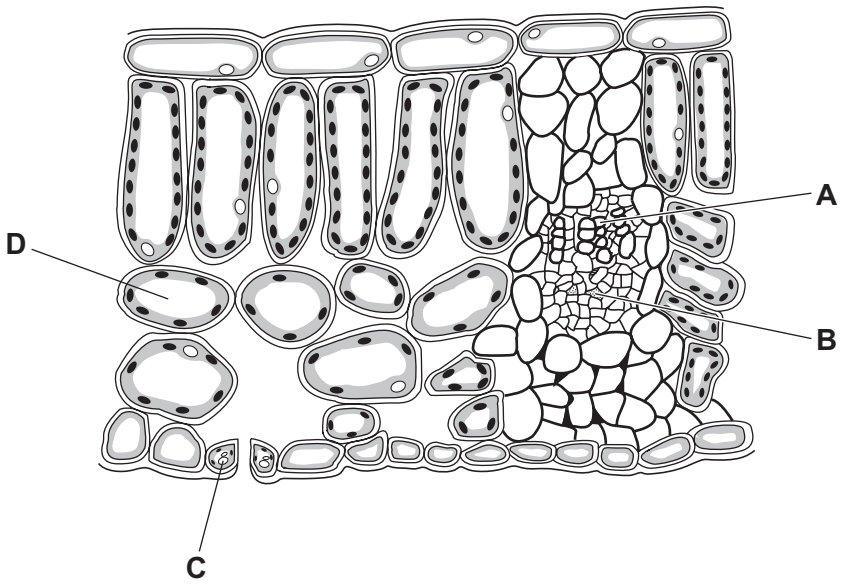
3 Some species of bacteria live in alkaline hot springs at temperatures of 80 °C.

Which conditions will best suit the enzymes of these bacteria?

	temperature / °C	pH
A	30	3
B	30	9
C	70	3
D	70	9

4 The diagram shows a cross-section of a leaf.

Which structure is a xylem cell?

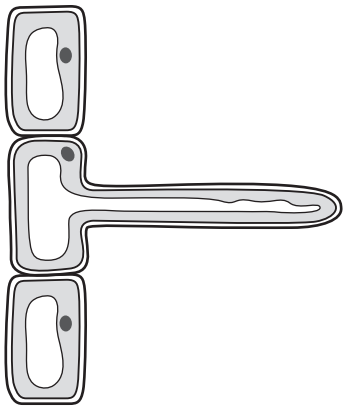


5 There was an increase of 27% in the number of hospital admissions related to scurvy between 2009 and 2014.

Which row explains this change?

	diet contains	number of people
A	too little vitamin C	decrease
B	too little vitamin D	decrease
C	too little vitamin C	increase
D	too little vitamin D	increase

6 The diagram shows a root hair cell and some of the adjacent cells.



Which statement about the root hair cell compared to the other cells in the diagram is correct?

A It has less cytoplasm.

B It has a smaller vacuole.

C It has a larger surface area.

D It has no nucleus.

7 What leads to coronary heart disease?

A Coronary arteries become blocked.

B Coronary arteries become enlarged.

C Heart muscles become enlarged.

D Heart muscles do **not** contract.

8 A student runs 5 km.

Which statement describes the change in the student's breathing 5 minutes after the run ends?

A Depth decreases and rate decreases.

B Depth decreases and rate increases.

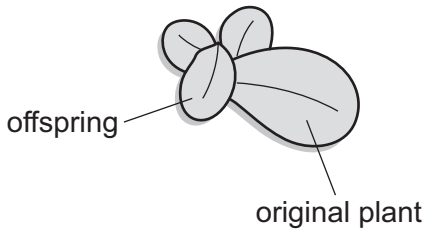
C Depth increases and rate decreases.

D Depth increases and rate increases.

9 Which row shows the effect of adrenaline?

	effect on pupil diameter	effect on heart rate
A	narrows	decreases
B	widens	decreases
C	narrows	increases
D	widens	increases

10 A certain aquatic plant reproduces by forming offspring from the original plant.



Which statement describes the reproduction of this aquatic plant?

A asexual reproduction which produces genetically different plants

B asexual reproduction which produces genetically identical plants

C sexual reproduction which produces genetically different plants

D sexual reproduction which produces genetically identical plants

11 Two parents with genotypes of BB and Bb are crossed.

What is the predicted ratio of genotypes in the offspring?

A 1 BB : 1 Bb **B** 1 Bb : 1 bb **C** 3 BB : 1 Bb **D** 3 Bb : 1 BB

12 Three stages involved in the selective breeding of wheat to increase the size of the seeds are shown.

1 crossing wheat plants to produce the next generation

2 selection by humans of wheat with large seeds

3 selection of wheat offspring with large seeds

What is the correct sequence of these stages?

A $1 \rightarrow 2 \rightarrow 3$ **B** $2 \rightarrow 1 \rightarrow 3$ **C** $2 \rightarrow 3 \rightarrow 1$ **D** $3 \rightarrow 1 \rightarrow 2$

13 What are undesirable effects of deforestation?

A habitat creation and decreased carbon dioxide in the atmosphere

B habitat creation and increased carbon dioxide in the atmosphere

C habitat destruction and decreased carbon dioxide in the atmosphere

D habitat destruction and increased carbon dioxide in the atmosphere

14 A mixture contains carbon, potassium nitrate and sulfur.

Which description of this mixture is correct?

A one compound and two elements

B two compounds and one element

C three elements

D four elements

15 Atoms consist of protons, neutrons and electrons.

Which statement is correct?

A An electron has a relative mass of 1 and a negative charge.

B A proton has a relative mass of 1 and a positive charge.

C A proton has a relative mass of less than 1 and a negative charge.

D A neutron has a relative mass of less than 1 and no charge.

16 Which statement about simple molecules is correct?

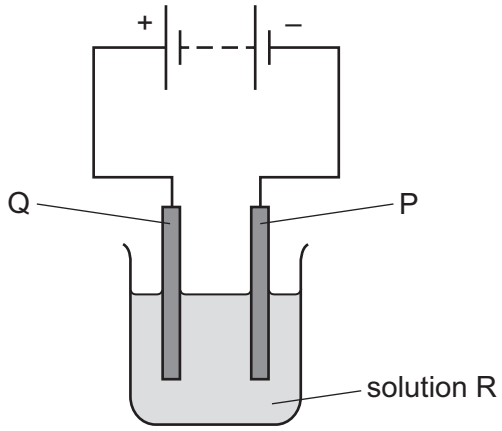
A They contain both metallic and non-metallic elements.

B They have good electrical conductivity.

C They contain covalent bonds.

D They have high melting points.

17 The apparatus for the electrolysis of solution R is shown.



What are the names of P, Q and R?

	P	Q	R
A	anode	cathode	electrode
B	anode	cathode	electrolyte
C	cathode	anode	electrode
D	cathode	anode	electrolyte

18 Which row describes an endothermic reaction?

	thermal energy is transferred to the surroundings	the temperature of the reaction mixture decreases
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

19 Which change is a chemical change?

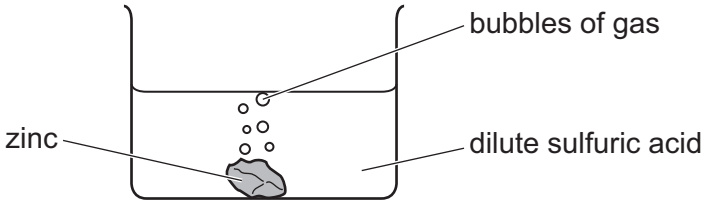
A boiling water

B combustion of alkanes

C filtering a mixture of sand and water

D fractional distillation of petroleum

20 The diagram shows zinc reacting with dilute sulfuric acid.



Which change does **not** increase the rate of the reaction?

A Add a catalyst.

B Increase the concentration of dilute sulfuric acid.

C Increase the temperature of dilute sulfuric acid.

D Decrease the surface area of zinc.

21 The equation for the reaction between copper(II) oxide and carbon is shown.

$$2CuO + C \rightarrow 2Cu + CO_2$$

Which substance is oxidised in this reaction?

A C **B** CO_2 **C** Cu **D** CuO

22 Substance Y is added to water containing universal indicator.

The pH of the mixture increases.

What is Y?

A HCl **B** K **C** NaCl **D** SO_2

23 An acid reacts with an alkali to produce an aqueous solution of a salt.

Which procedure is used to obtain crystals of the salt from the solution?

A Distil the solution.

B Evaporate the solution to dryness.

C Filter the solution.

D Partially evaporate the solution and leave it to cool.

24 Which statement about elements in the Periodic Table is correct?

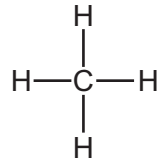
A The density of the elements in Group I increases up the group.

B The metallic character of the elements increases across a period from left to right.

C The number of protons in the atoms of the elements increases across a period from left to right.

D The reactivity of the elements in Group VII increases down the group.

25 The displayed formulas of four compounds are shown.



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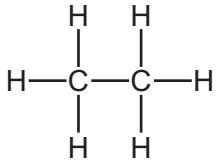

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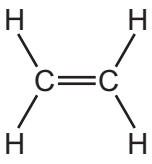

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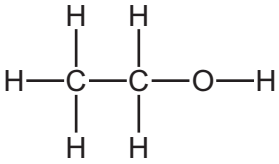


4

Which formulas represent ethanol and ethene?

	ethanol	ethene
A	4	2
B	1	3
C	4	3
D	2	1

26 Which statement about fossil fuels is correct?

A Ethane is the main constituent of natural gas.

B Gas oil is used as a fuel in diesel engines.

C Naphtha is used for heating and cooking.

D Petroleum is used as a fuel in car engines.

27 Acidified aqueous silver nitrate is added to a solution.

Which ion causes a white precipitate to form?

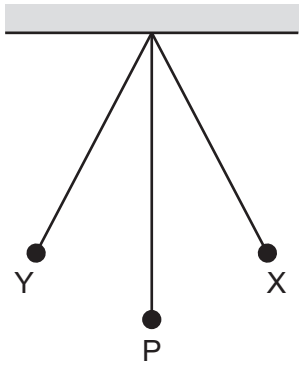
A chloride ions, Cl^-

B copper ions, Cu^{2+}

C hydroxide ions, OH^-

D sodium ions, Na^+

28 A pendulum swings backwards and forwards between point X and point Y.



A student starts a stop-watch as the pendulum first passes point P.

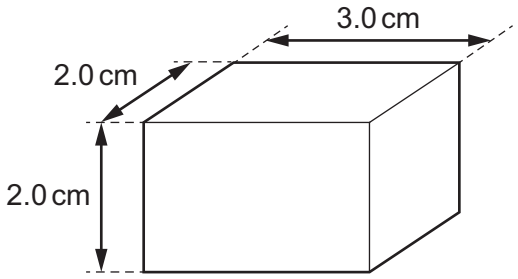
The student stops the stop-watch when he counts that the pendulum passes point P another 10 times.

The time on the stop-watch is 8.0 s.

What is the period of the pendulum?

A 0.40 s **B** 0.80 s **C** 1.6 s **D** 8.0 s

29 The diagram shows a solid rectangular block made of material of density 2.0 g / cm^3.



What is the mass of the block?

A 2.0 g **B** 6.0 g **C** 14 g **D** 24 g

30 A student runs up some stairs.

Which quantities are used to calculate the power of the student?

A the weight of the student and the vertical distance moved

B the weight of the student and the time taken

C the work done by the student and the vertical distance moved

D the work done by the student and the time taken

31 Which statement describes the behaviour of particles during the evaporation of a liquid?

A Only the more energetic particles escape.

B Particles bond together.

C Particles move closer together.

D The least energetic particles escape first.

32 What is the method of thermal energy transfer from the Sun to the Earth through the vacuum of space?

A conduction

B convection

C evaporation

D radiation

33 Which statement about waves is correct?

A They do not transfer energy or matter.

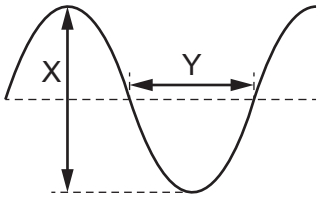
B They transfer energy and matter.

C They transfer energy but not matter.

D They transfer matter but not energy.

34 Which wave diagram shows the amplitude X and the wavelength Y of a wave?

A



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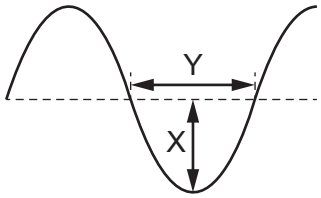

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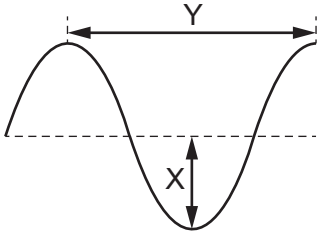

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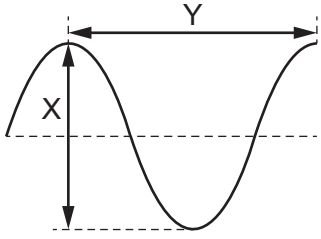
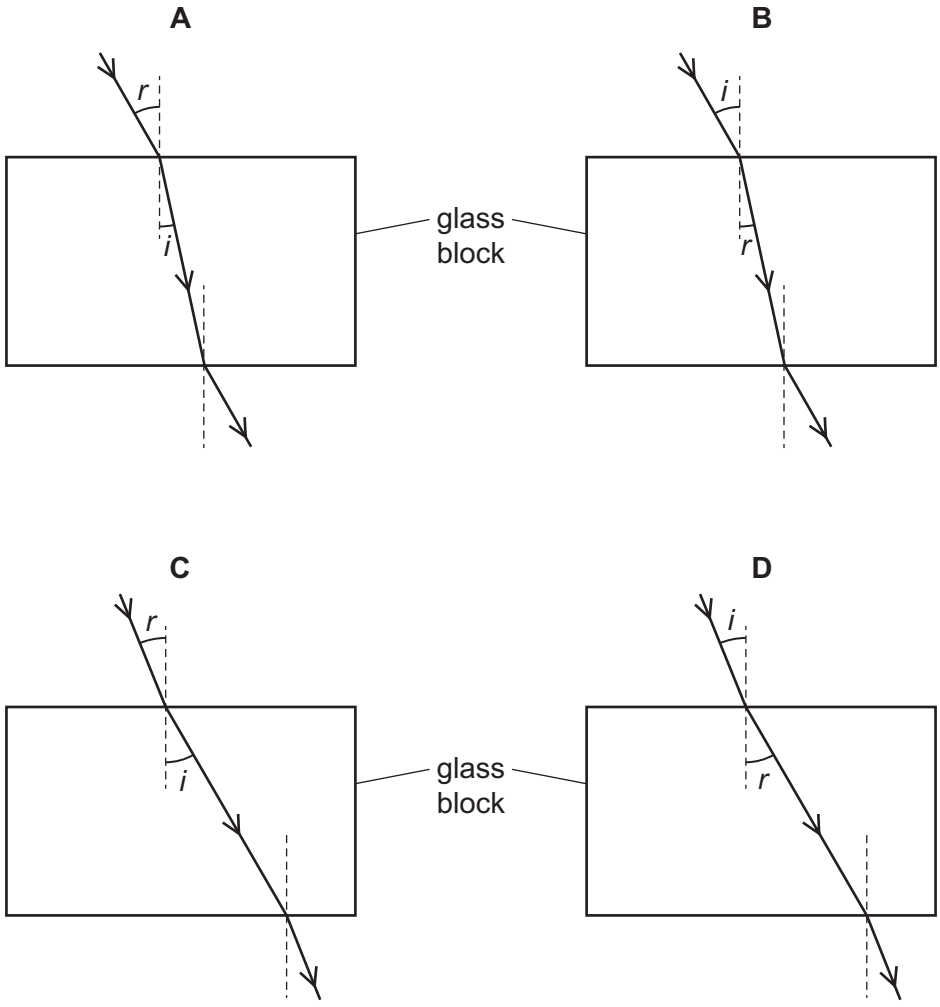


35 Light travelling in air passes through a glass block.

Which diagram shows the refraction of the light, with the angle of incidence labelled *i* and the angle of refraction labelled *r*?



36 Which quantity is a flow of electrons through an electrical conductor?

A current

B power

C resistance

D voltage

37 The table shows the voltage across and the current in four lamps.

Which lamp has the greatest resistance?

	voltage / V	current / A
A	2.0	0.40
B	4.0	0.50
C	6.0	2.0
D	12	3.0

38 A 4.0 Ω resistor is connected in parallel with an 8.0 Ω resistor.

What is their combined resistance?

A less than 4.0 Ω

B between 4.0 Ω and 8.0 Ω

C between 8.0 Ω and 12.0 Ω

D exactly 12.0 Ω

39 A box is made from aluminium that is 20 mm thick.

Which statement explains why this box is **not** used to store all types of radioactive materials?

A It only prevents the escape of α-particles and β-particles.

B It only prevents the escape of α-particles.

C It only prevents the escape of β-particles and γ-rays.

D It only prevents the escape of γ-rays.

40 Which type of force keeps an object in orbit around the Sun and which type of force forms a protostar?

	force keeping an object in orbit around the Sun	force that forms a protostar
A	gravitational	magnetic
B	gravitational	gravitational
C	magnetic	magnetic
D	magnetic	gravitational

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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.).