



Cambridge IGCSE™ (9–1)

CO-ORDINATED SCIENCES

Paper 2 Multiple Choice (Extended)

0973/22

May/June 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 characteristic occurs in **all** living organisms?

- A egestion
- B excretion
- C photosynthesis
- D plasmolysis

2 Which row shows a specialised cell type matched with its function?

	cell type	function
A	ciliated	movement of mucus
B	egg	transport of oxygen
C	red blood	phagocytosis
D	root hair	photosynthesis

3 The mass of a peeled potato is recorded.

The potato is put in a salt solution with a lower water potential than the potato for two hours.

The outside of the potato is then dried and the mass recorded.

Which statement explains what happens to the potato after two hours in the salt solution?

- A It gained mass by osmosis as salt moved into the potato from the surrounding solution.
- B It gained mass by osmosis as water moved into the potato from the surrounding solution.
- C It lost mass by osmosis as water moved from the potato into the surrounding solution.
- D It lost mass by osmosis as salt moved from the potato into the surrounding solution.

4 Which row shows a large molecule and the small molecule it is made from?

	large molecule	small molecule
A	glycogen	glucose
B	glycogen	amino acid
C	oil	amino acid
D	oil	glucose

- 5 Six test-tubes contain amylase and starch solution. The temperatures of the test-tube contents are different. All other conditions are the same.

The table shows the time taken for the amylase to break down the starch.

temperature / °C	25	30	35	40	45	50
time / seconds	121	87	46	43	72	99

At which temperature is the activity of the amylase greatest?

- A** 25 °C **B** 35 °C **C** 40 °C **D** 50 °C

- 6 Which row shows the transport and use of nitrate ions by plants?

	tissue used to transport nitrate ions around plant	nitrate ions used to make
A	phloem	amino acids
B	xylem	glucose
C	phloem	glucose
D	xylem	amino acids

- 7 Starch is chemically digested into maltose by the enzyme amylase.

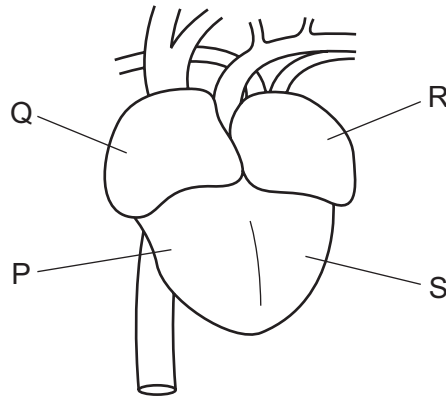
What are the properties of the maltose molecules?

- A** large and insoluble
B large and soluble
C small and insoluble
D small and soluble

- 8 Which row shows the conditions that will increase the rate of transpiration from a plant?

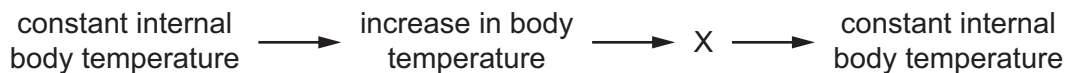
	temperature	humidity
A	high	low
B	high	high
C	low	high
D	low	low

- 9 The diagram shows a front view of a human heart.



What is the sequence in which a blood cell passes through the four chambers of the heart?

- A $P \rightarrow S \rightarrow R \rightarrow Q$
 - B $Q \rightarrow P \rightarrow R \rightarrow S$
 - C $R \rightarrow Q \rightarrow P \rightarrow S$
 - D $S \rightarrow R \rightarrow Q \rightarrow P$
- 10 The homeostatic control of body temperature is shown.



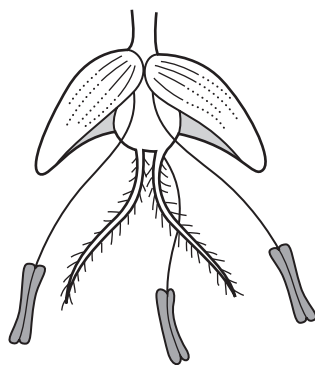
Which processes happen at X?

- A vasodilation and increased shivering
 - B vasodilation and increased sweating
 - C vasoconstriction and increased shivering
 - D vasoconstriction and increased sweating
- 11 Some information about a donkey and a horse is shown.
- The sperm from a donkey is able to fertilise the egg from a horse.
 - The nucleus of a body cell from a horse has 64 chromosomes.
 - The nucleus of a sperm cell from a donkey has 31 chromosomes.
 - The offspring from a cross between a donkey and a horse is called a mule.

How many chromosomes are in the nucleus of a body cell from a mule?

- A 31
- B 63
- C 64
- D 95

12 The diagram shows a flower.



What is the method of pollination for this flower and the structural adaptation that enables this?

- A insect pollination because the anthers are feathery
- B insect pollination because the stigmas are feathery
- C wind pollination because the anthers are feathery
- D wind pollination because the stigmas are feathery

13 Information about a lake is shown.

- Aquatic plants grow in the lake.
- Aquatic plants are eaten by small fish.
- Small fish are eaten by large fish.
- Small fish are eaten by frogs.

Which statement is correct?

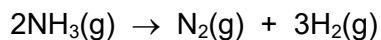
- A The frogs are primary consumers.
- B The large fish are secondary consumers.
- C The small fish are at trophic level 1.
- D The aquatic plants are herbivores.

14 Which statement explains why metals conduct electricity?

- A There is a 'sea' of delocalised electrons.
- B The positive ions move over each other.
- C There is an electrostatic attraction between the oppositely charged particles.
- D The particles in a metal vibrate and pass on the electric current.

- 15** Ammonia decomposes when heated in a sealed container in the presence of an iron catalyst.

The equation for the reaction is shown.



40.0 dm³ of ammonia is heated. After several hours, 21.0 dm³ of hydrogen is present.

The volumes are measured at r.t.p.

What is the percentage of unreacted ammonia?

- A** 35.0% **B** 47.5% **C** 52.5% **D** 65.0%

- 16** The table shows the initial and final temperatures of four different reactions.

reaction	initial temperature / °C	final temperature / °C
1	20	20
2	20	30
3	25	20
4	25	30

Which reactions are exothermic?

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

- 17** Which processes are physical changes?

- 1 Hydrogen gas joins with oxygen gas to form steam.
- 2 Liquid water turns into steam.
- 3 $\text{Cl}_2(\text{g}) \rightarrow 2\text{Cl}(\text{g})$
- 4 $\text{CH}_4(\text{l}) \rightarrow \text{CH}_4(\text{g})$

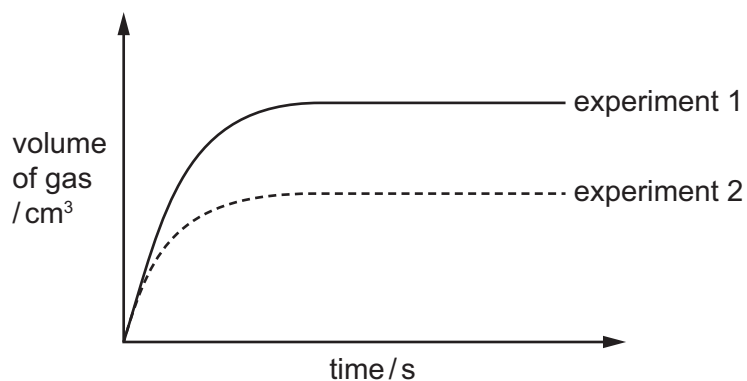
- A** 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

18 Equal masses of limestone pieces are reacted with acid in two experiments.

Only one change to the conditions is made between experiment 1 and experiment 2.

The volume of gas produced is measured over time.

The results are shown.



Which statement about the experiments is correct?

- A** The concentration of acid used in experiment 2 is higher than in experiment 1.
- B** The temperature used in experiment 2 is lower than in experiment 1.
- C** The limestone pieces used in experiment 1 are larger than in experiment 2.
- D** The volume of acid used in experiment 1 is greater than in experiment 2.

19 Which row describes an element on the left of the Periodic Table and its oxide?

	type of element	type of oxide
A	metallic	basic
B	non-metallic	acidic
C	metallic	acidic
D	non-metallic	basic

- 24** A student prepares an insoluble salt by neutralising an acid with an alkali.

Which method is used to separate the salt from the reaction mixture?

- A** chromatography
- B** distillation
- C** evaporation
- D** filtration

- 25** A molecule of methane contains one carbon atom and has the formula CH_4 .

A molecule of octane contains eight carbon atoms.

How many hydrogen atoms are in a molecule of octane?

- A** 11 **B** 16 **C** 18 **D** 32

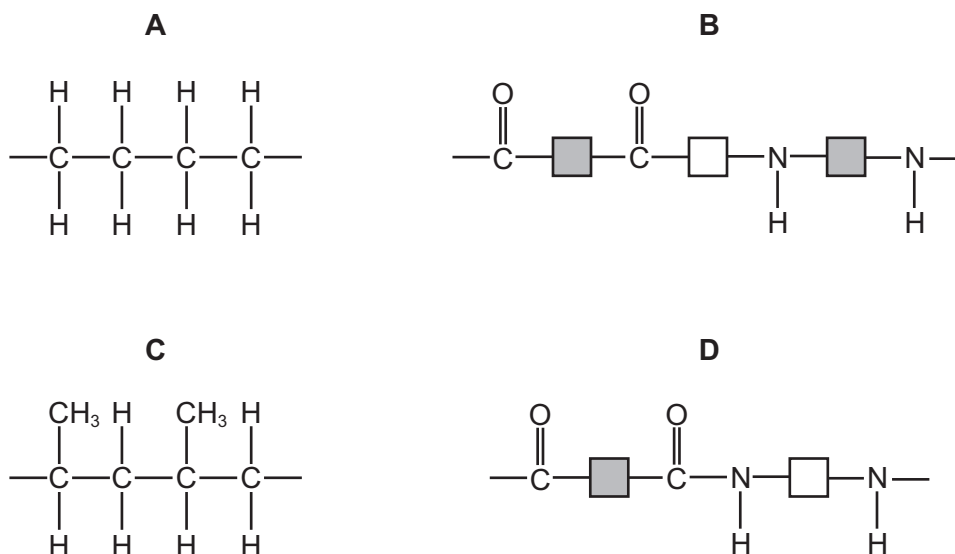
- 26** Large alkane molecules are cracked to form smaller molecules.

Which equations represent cracking reactions?

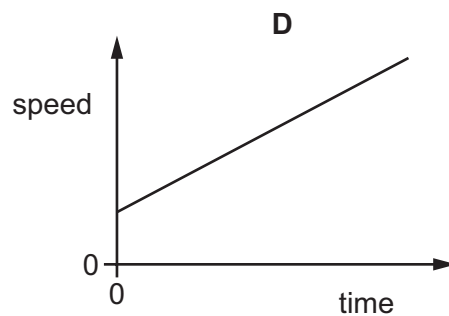
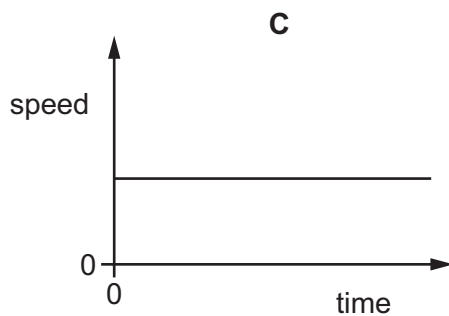
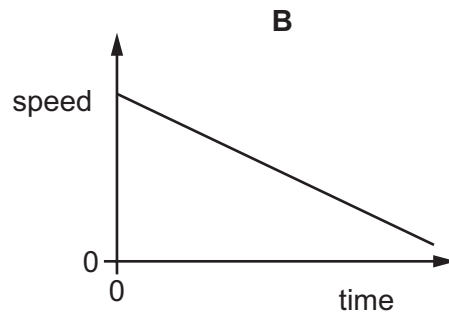
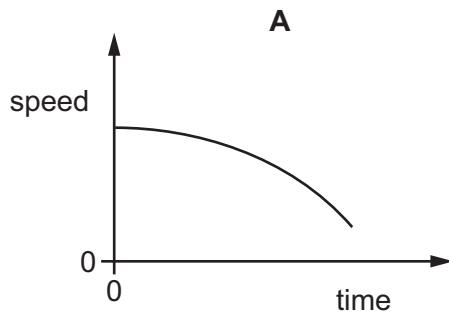
- 1 $\text{C}_{18}\text{H}_{38} \rightarrow 2\text{C}_6\text{H}_{14} + \text{C}_6\text{H}_{12}$
- 2 $\text{C}_{18}\text{H}_{38} \rightarrow \text{H}_2 + 3\text{C}_6\text{H}_{12}$
- 3 $\text{C}_{15}\text{H}_{32} \rightarrow \text{C}_5\text{H}_{10} + 2\text{C}_5\text{H}_{12}$
- 4 $\text{C}_{15}\text{H}_{32} \rightarrow \text{C}_6\text{H}_{14} + \text{C}_5\text{H}_{10} + \text{C}_4\text{H}_8$

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

- 27** Which diagram represents the structure of nylon?



28 In which speed–time graph is acceleration **not** constant or 0?



29 A lamp produces 760 J of wasted energy for every 1000 J of energy supplied to it.

What is the efficiency of the lamp?

- A** 0.24% **B** 0.76% **C** 24% **D** 76%

30 Atmospheric pressure is $1.0 \times 10^5 \text{ Pa}$.

A football pitch is 105 m long and 68 m wide.

What is the total weight of the air above the football pitch?

- A** 14 N **B** $1.7 \times 10^7 \text{ N}$ **C** $3.5 \times 10^7 \text{ N}$ **D** $7.1 \times 10^8 \text{ N}$

31 Which surface reflects the most thermal radiation?

- A** a black, dull surface
B a black, shiny surface
C a white, dull surface
D a white, shiny surface

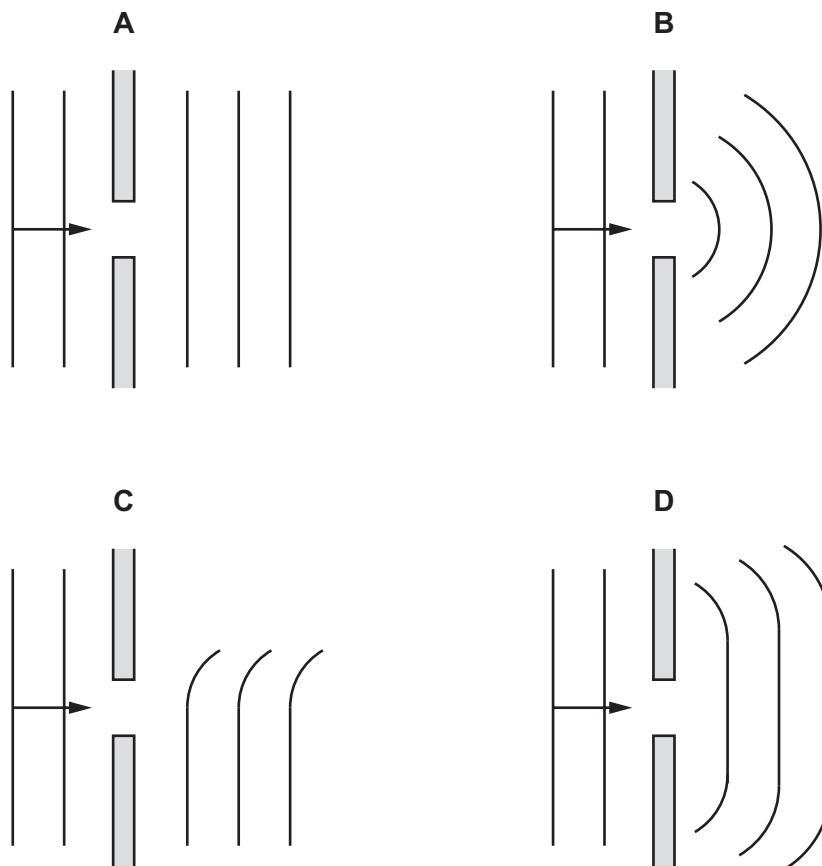
- 32** Liquid water boils at 100°C to produce steam. The volume of the steam at 100°C is much greater than the volume of the liquid water.

Which statement explains the increase in volume at 100°C ?

- A** The water molecules move faster in steam than in liquid water.
- B** The water molecules are further apart in steam than in liquid water.
- C** The water molecules are larger in steam than in liquid water.
- D** The water molecules are regularly arranged in liquid water but are randomly arranged in steam.

- 33** A wave approaches a gap in a barrier. The gap is the same size as the wavelength of the wave. The arrow shows the direction of the wave.

Which diagram shows what happens to the wave after it passes through the gap?



- 34** What is the difference between a real image and a virtual image?

- A** A real image can be shown on a screen, but a virtual image cannot.
- B** A real image is always formed by a magnifying glass.
- C** A real image is always formed by a plane mirror.
- D** A virtual image can be shown on a screen, but a real image cannot.

35 Which row shows the type of electromagnetic wave used in each application?

	television remote controllers	satellite television
A	infrared	microwaves
B	infrared	ultraviolet
C	microwaves	microwaves
D	microwaves	ultraviolet

36 A student makes an electromagnet with a steel core.

There is a problem with the electromagnet.

Which problem with the electromagnet is caused by using a steel core?

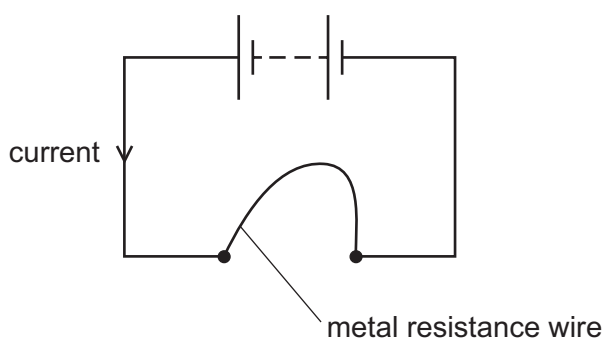
- A** The electromagnet does not become magnetised.
- B** The electromagnet has the same type of magnetic pole at each end.
- C** The electromagnet remains magnetised when it is switched off.
- D** The electromagnet repels unmagnetised magnetic materials.

37 There is a current of 100 mA in a circuit.

How much charge flows through the circuit in 1.5 minutes?

- A** 0.15 C
- B** 9.0 C
- C** 150 C
- D** 9000 C

38 A student connects a length of metal resistance wire to a battery.

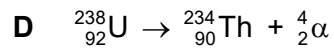
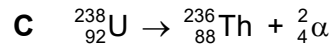
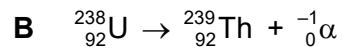
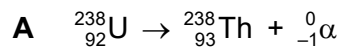


Which change increases the current in the resistance wire?

- A** connecting a second wire in series with the first wire
- B** heating the wire
- C** making the wire shorter
- D** making the wire thinner

- 39** A nucleus of ${}^{238}_{92}\text{U}$ undergoes radioactive decay to produce a nucleus of thorium (Th) and an alpha particle.

Which equation shows this decay?



- 40** Which process describes how energy is released from a stable star?

- A** fission of helium into hydrogen
- B** fission of hydrogen into helium
- C** fusion of helium into hydrogen
- D** fusion of hydrogen into helium

BLANK PAGE

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.

The Periodic Table of Elements

Group																											
I	II	Key										III	IV	V	VI	VII	VIII										
		<div>1Hhydrogen1</div>																									
3Li lithium 7	4Be beryllium 9	<div>atomic number atomic symbol name relative atomic mass</div>										5B boron 11	6C carbon 12	7N nitrogen 14	8O oxygen 16	9F fluorine 19	2He helium 4										
11Na sodium 23	12Mg magnesium 24											13Al aluminium 27	14Si silicon 28	15P phosphorus 31	16S sulfur 32	17Cl chlorine 35.5	18Ar argon 40										
19K potassium 39	20Ca calcium 40											21Sc scandium 45	22Ti titanium 48	23V vanadium 51	24Cr chromium 52	25Mn manganese 55	26Fe iron 56	27Co cobalt 59	28Ni nickel 59	29Cu copper 64	30Zn zinc 65	31Ga gallium 70	32Ge germanium 73	33As arsenic 75	34Se selenium 79	35Br bromine 80	36Kr krypton 84
37Rb rubidium 85	38Sr strontium 88											39Y yttrium 89	40Zr zirconium 91	41Nb niobium 93	42Mo molybdenum 96	43Tc technetium —	44Ru ruthenium 101	45Rh rhodium 103	46Pd palladium 106	47Ag silver 108	48Cd cadmium 112	49In indium 115	50Sn tin 119	51Sb antimony 122	52Te tellurium 128	53I iodine 127	54Xe xenon 131
55Cs caesium 133	56Ba barium 137	lanthanoids										57–71	72Hf hafnium 178	73Ta tantalum 181	74W tungsten 184	75Re rhenium 186	76Os osmium 190	77Ir iridium 192	78Pt platinum 195	79Au gold 197	80Hg mercury 201	81Tl thallium 204	82Pb lead 207	83Bi bismuth 209	84Po polonium —	85At astatine —	86Rn radon —
87Fr francium —	88Ra radium —	actinoids										89–103	104Rf rutherfordium —	105Db dubnium —	106Sg seaborgium —	107Bh bohrium —	108Hs hassium —	109Mt meitnerium —	110Ds darmstadtium —	111Rg roentgenium —	112Cn copernicium —	113Nh nihonium —	114Fl flerovium —	115Mc moscovium —	116Lv livermorium —	117Ts tennessine —	118Og oganesson —

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.).