



Cambridge IGCSE™

COMBINED SCIENCE

0653/12

Paper 1 Multiple Choice (Core)

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)

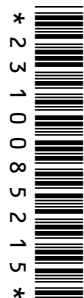
INSTRUCTIONS

- 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.



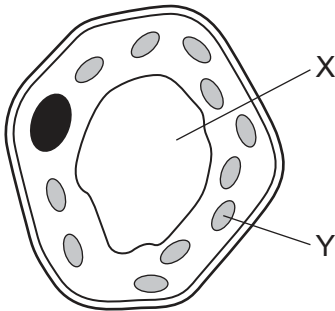
2

- 1 Which word describes the removal of waste products and substances in excess of requirements from an organism?
- A absorption

B egestion

C excretion

D ingestion
- 2 The diagram shows a plant cell.



Which row identifies structures X and Y and their functions?

	X		Y	
	structure	function	structure	function
A	cytoplasm	photosynthesis	nucleus	storage
B	vacuole	storage	nucleus	photosynthesis
C	cytoplasm	photosynthesis	chloroplast	storage
D	vacuole	storage	chloroplast	photosynthesis

- 3 Oxygen gas moves into red blood cells from the alveoli.
- What is this process?
- A diffusion

B evaporation

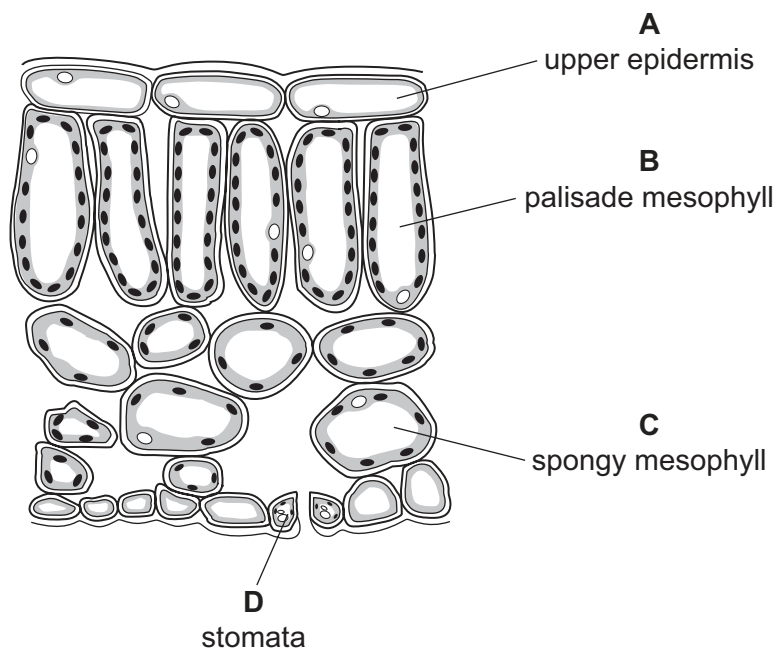
C osmosis

D transpiration

3

- 4** A student labels a section through a leaf as shown.

Which label is **not** correct?



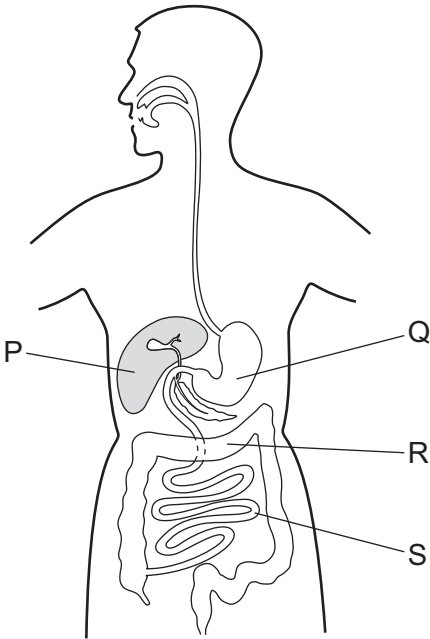
- 5** What are the chemical elements in an enzyme?

- A** carbon, oxygen, hydrogen and nitrogen
- B** carbon, oxygen and hydrogen only
- C** carbon and oxygen only
- D** oxygen and nitrogen only

- 6** Which statement describes chemical digestion?

- A** Food molecules pass along the alimentary canal.
- B** Large food molecules break down into smaller molecules.
- C** Large pieces of food break down into smaller pieces.
- D** Nutrients pass through the wall of the small intestine.

7 The diagram shows the alimentary canal and associated organs.



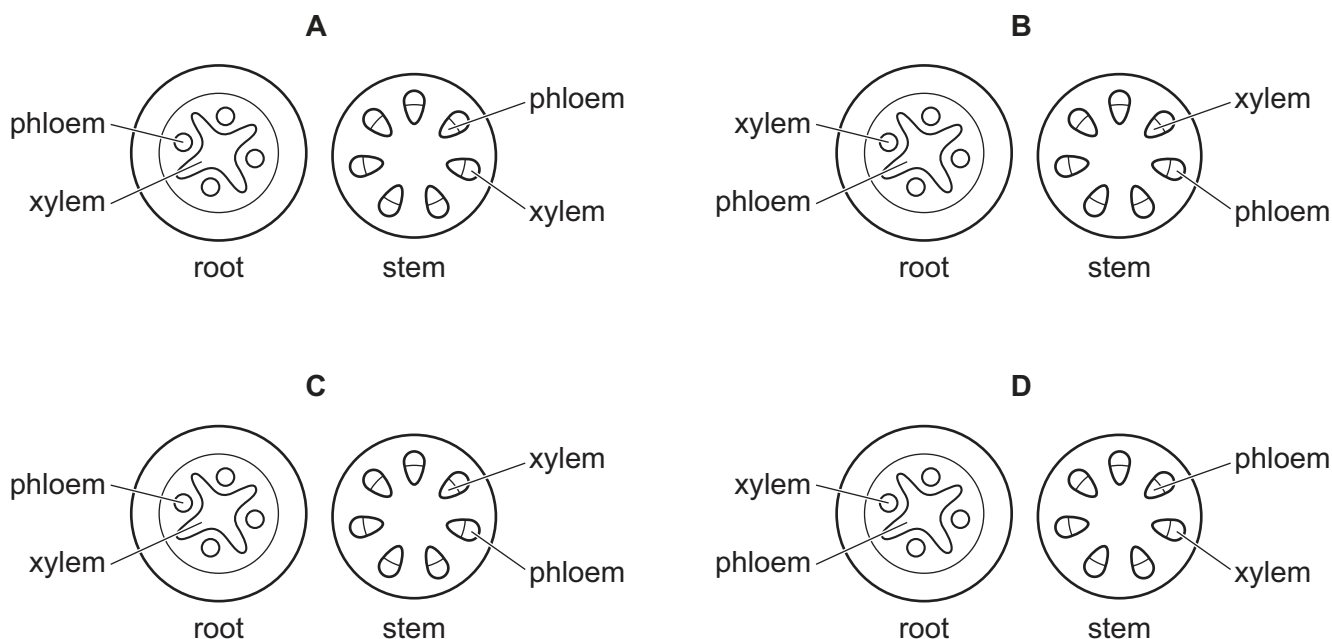
Which row shows the labels for parts P, Q, R and S?

	P	Q	R	S
A	liver	stomach	large intestine	small intestine
B	stomach	liver	small intestine	large intestine
C	liver	stomach	pancreas	large intestine
D	stomach	liver	pancreas	small intestine

5

8 The diagrams show cross-sections of roots and stems from non-woody dicotyledonous plants.

Which diagram identifies the position of the phloem and xylem in the root and stem?



9 Which molecules are required for aerobic respiration?

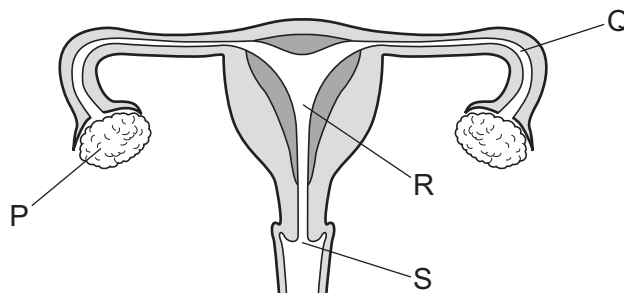
- A carbon dioxide and oxygen
- B carbon dioxide and water
- C glucose and oxygen
- D glucose and water

10 What is the definition of pollination?

- A the transfer of pollen grains from an anther to an ovule
- B the transfer of pollen grains from an anther to a stigma
- C the transfer of pollen grains from a stigma to an anther
- D the transfer of pollen grains from a stigma to an ovule

6

11 The diagram shows the human female reproductive system.



Which row identifies the functions of the labelled parts?

	releases eggs	site of fertilisation	where the fetus develops
A	P	P	S
B	P	Q	R
C	Q	P	S
D	Q	Q	R

12 Which process in the carbon cycle releases carbon back into the atmosphere?

- A** feeding
- B** formation of fossil fuels
- C** photosynthesis
- D** respiration

13 Which type of organism makes its own organic nutrients?

- A** carnivore
- B** consumer
- C** herbivore
- D** producer

14 Which statement describes how an atom forms an ion with a 1+ charge?

- A** The atom gains 1 electron.
- B** The atom gains 7 electrons.
- C** The atom loses 1 electron.
- D** The atom loses 7 electrons.

7

15 Which molecule contains the lowest number of outer-shell electrons?

- A Cl_2 B CH_4 C H_2 D H_2O

16 The ratio of the atoms Na : C : O in sodium carbonate is 2 : 1 : 3.

What is the formula of sodium carbonate?

- A Na_2CO_3 B $\text{Na}_2(\text{CO})_3$ C 2NaCO_3 D $2\text{Na}_2(\text{CO}_3)_2$

17 Which equation is balanced?

- A $2\text{CO} + \text{O}_2 \rightarrow 2\text{CO}_2$
B $\text{Cu} + \text{O}_2 \rightarrow \text{CuO}$
C $2\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$
D $2\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$

18 What is produced at the anode during the electrolysis of molten lead(II) bromide?

- A bromide ions
B bromine
C lead
D lead(II) ions

19 Which reaction is **most** endothermic?

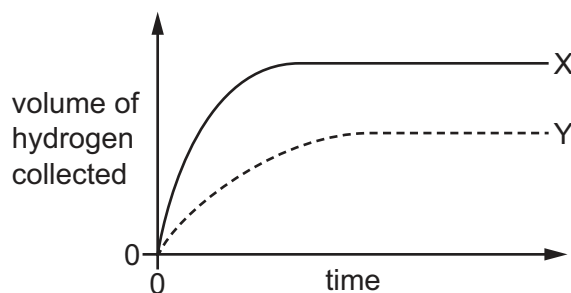
	initial temperature / °C	final temperature / °C
A	21	19
B	20	22
C	19	18
D	18	23

20 Which statement indicates that a chemical change occurs?

- A Energy is absorbed.
B There is a change in colour.
C There is a change of state.
D There is no change in mass.

21 Dilute sulfuric acid reacts with excess zinc granules. Hydrogen gas forms.

Line X on the graph shows the results.



Which change results in line Y?

- A** Add a catalyst.
- B** Decrease the concentration of the acid.
- C** Decrease the temperature.
- D** Increase the size of the zinc granules.

22 Which statement describes what happens during reduction?

- A** An element gains oxygen.
- B** A compound gains oxygen.
- C** A compound loses oxygen.
- D** A mixture of elements loses oxygen.

23 Which row describes an acid?

	pH	reaction with metals	reaction with bases
A	2	forms water	forms hydrogen
B	3	forms hydrogen	forms water
C	4	forms hydrogen	forms hydrogen
D	8	forms water	forms water

24 Which change occurs from lithium to neon across Period 2 of the Periodic Table?

- A** Atomic mass decreases.
- B** Atoms of the elements have fewer electrons in their outer shells.
- C** The electrical conductivity of the elements increases.
- D** There is a change from metallic to non-metallic character.

25 Which row shows the name of an ore of iron and the process used to extract iron from the ore?

	ore	process
A	bauxite	electrolysis
B	bauxite	reduction in the blast furnace
C	hematite	electrolysis
D	hematite	reduction in the blast furnace

26 Sugar dissolves in water to form sugar solution.

Which word describes the sugar?

- A** filtrate
- B** residue
- C** solute
- D** solvent

27 Which methods of separation depend on the substances in a mixture having different boiling points?

- A** crystallisation and simple distillation
- B** evaporation and filtration
- C** fractional distillation and chromatography
- D** fractional distillation and simple distillation

28 A solid block has mass m and weight W .

The volume of the block is V .

Which expression gives the density of the block?

- A** $\frac{m}{V}$ **B** $\frac{V}{m}$ **C** $\frac{V}{W}$ **D** $\frac{W}{V}$

10

29 Three horizontal forces act on a box as shown.



What is the resultant horizontal force acting on the box?

- A 3.0 N to the left
 - B 3.0 N to the right
 - C 23 N to the left
 - D 23 N to the right
- 30 Which process is the escape of the more energetic particles from the surface of a liquid?
- A conduction
 - B convection
 - C evaporation
 - D radiation
- 31 Which row shows a good thermal conductor and a thermal insulator?

	good thermal conductor	thermal insulator
A	copper	air
B	copper	aluminium
C	water	air
D	water	aluminium

32 Which row shows how particles in a liquid and a gas are arranged?

	liquid	gas
A	regularly	regularly
B	regularly	not regularly
C	not regularly	regularly
D	not regularly	not regularly

- 33** When a metal bar is heated, the separation of its particles increases and the bar becomes longer.

What is this process called?

- A** condensation
- B** contraction
- C** emission
- D** expansion

- 34** Which electromagnetic radiation has the lowest frequency?

- A** gamma
- B** infrared
- C** radio
- D** ultraviolet

- 35** A man hits a post with a hammer. This produces a sound. A student is a distance of 170 m from the man.

The speed of sound in air is 340 m/s.

How much time does it take for the sound to travel to the student?

- A** 0 s **B** 0.50 s **C** 1.0 s **D** 2.0 s

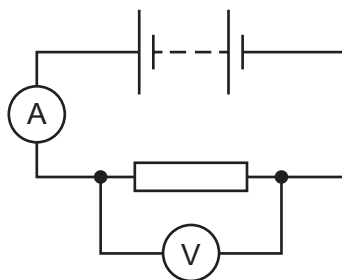
- 36** A stone dropped into a pond produces 20 circular wave crests in 1.0 minute.

What is the frequency of the wave?

- A** 0.050 Hz **B** 0.33 Hz **C** 3.0 Hz **D** 20 Hz

12

37 The diagram shows a circuit.



Which expression gives the resistance of the resistor?

- A** $\frac{\text{ammeter reading}}{\text{voltmeter reading}}$
- B** ammeter reading $\times$ voltmeter reading
- C** $\frac{\text{voltmeter reading}}{\text{ammeter reading}}$
- D** voltmeter reading + ammeter reading

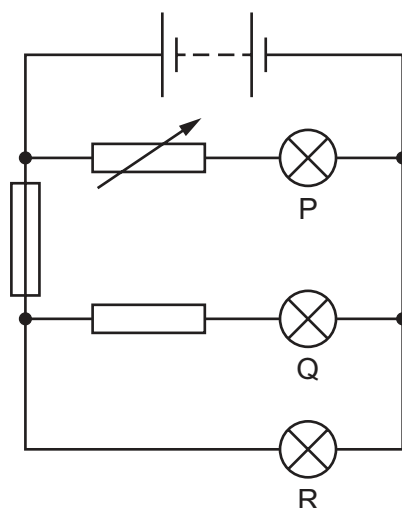
38 The voltage across a lamp is 10 V. The current in the lamp is 0.010 A.

How much energy does the lamp transfer in 50 s?

- A** 0.050 J **B** 5.0 J **C** 500 J **D** 50 000 J

39 The diagram shows a circuit containing three identical lamps, P, Q and R.

All the lamps are shining.



The fuse melts (blows).

Which lamps stop shining?

- A** P and Q **B** P only **C** Q and R **D** Q only

13

40 What causes a protostar to form from an interstellar cloud of gas and dust?

- A** gravitational attraction
- B** infrared radiation
- C** supernova explosion
- D** thermal convection

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The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
		1Hhydrogen1															
		Key															
		atomic number atomic symbol name relative atomic mass															
3 Li lithium 7	4 Be beryllium 9																
11 Na sodium 23	12 Mg magnesium 24																
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 oganeson —