



Cambridge IGCSE™

COMBINED SCIENCE

Paper 1 Multiple Choice (Core)

0653/11

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.

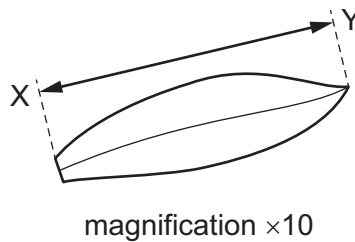
This document has **16** pages. Any blank pages are indicated.



1 What are characteristics of all living organisms?

- A excretion, breathing and sensitivity
- B gas exchange and muscle contraction
- C movement, excretion and respiration
- D muscle contraction and sensitivity

2 The diagram of a leaf is 40 mm long from X–Y.



What is the actual length of the leaf?

- A 0.25 mm
- B 2.5 mm
- C 4 mm
- D 400 mm

3 Which substance moves through a partially permeable membrane by osmosis?

- A amino acids
- B oxygen
- C sugar
- D water

4 Which small molecules join together to form large oil molecules?

- A amino acids and glucose
- B amino acids and glycerol
- C fatty acids and glucose
- D fatty acids and glycerol

5 Enzymes are Z..... that function as biological catalysts.

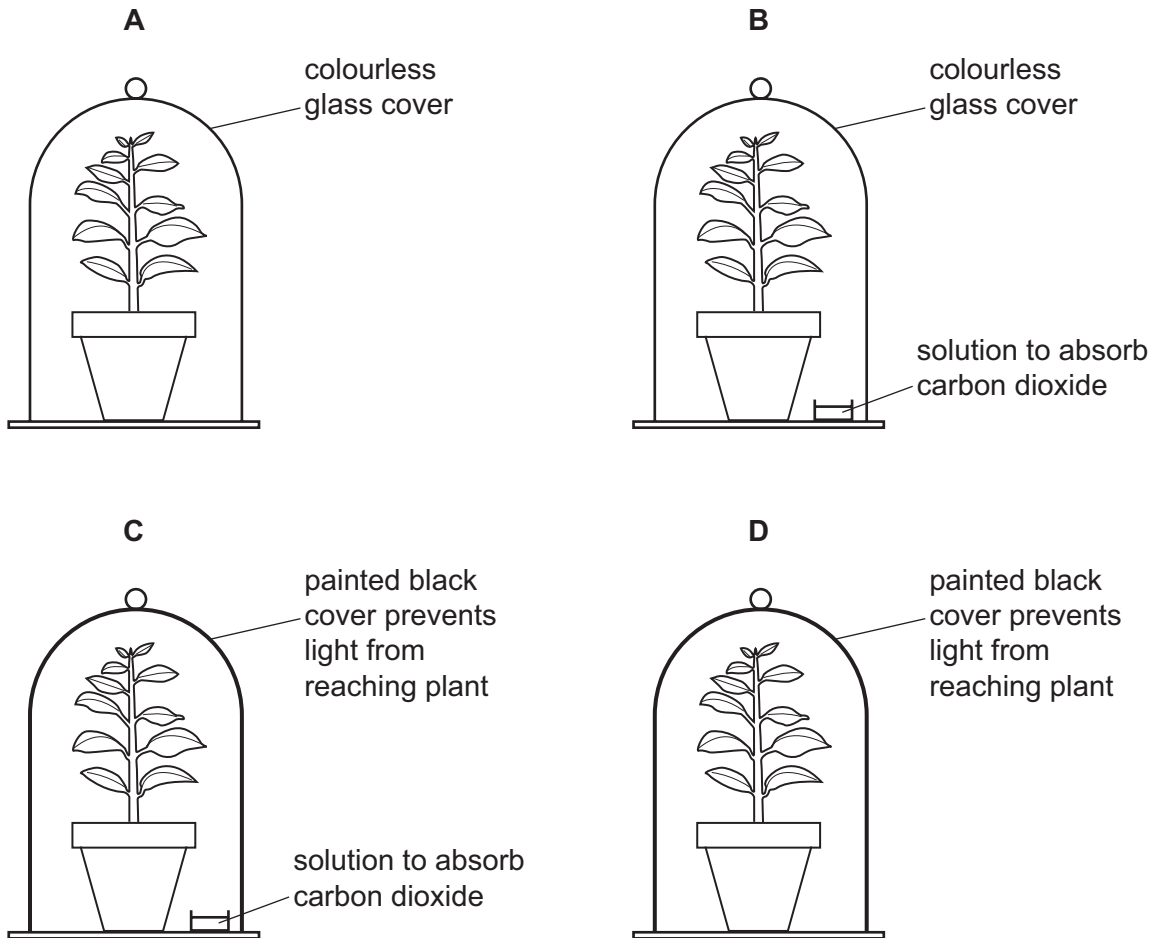
What is Z?

- A fats
- B proteins
- C sugars
- D vitamins

- 6 The diagrams show four identical, well-watered plants in different environments.

Each apparatus initially contains atmospheric air.

Which plant will produce the most oxygen?



- 7 Which part of a leaf of a dicotyledonous plant contains chloroplasts?

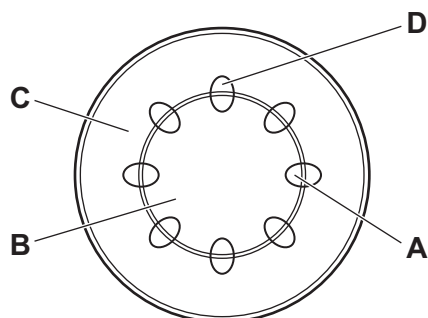
- A cuticle
- B palisade mesophyll
- C phloem
- D stomata

- 8 What is important for healthy teeth?

- A carbohydrates
- B fibre
- C iron
- D vitamin D

- 9 The diagram shows a cross-section of the stem of a dicotyledonous plant.

Which label shows the tissue responsible for the transport of water through the plant?



- 10 Aerobic respiration is described as the chemical reactions in cells that use 1..... to break down 2..... molecules to release 3..... .

Which words complete the description?

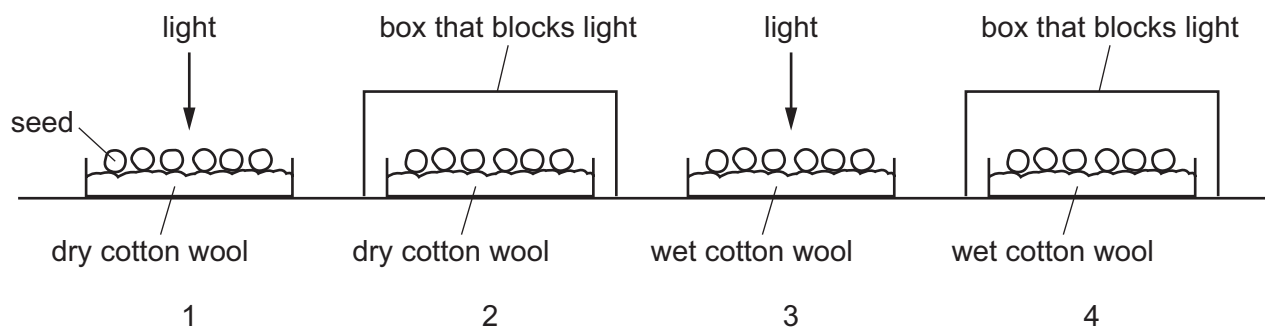
	1	2	3
A	energy	oxygen	carbon dioxide
B	oxygen	nutrient	energy
C	oxygen	carbon dioxide	nutrients
D	nutrients	oxygen	carbon dioxide

- 11 What is the function of the sepals in most insect-pollinated plants?

- A** to attract insects
- B** to make nectar
- C** to make pollen
- D** to protect flower buds

12 The diagram shows dishes containing the same type of seeds in different conditions.

Each dish is placed in atmospheric air and at a temperature suitable for germination.



In which dishes will the seeds germinate?

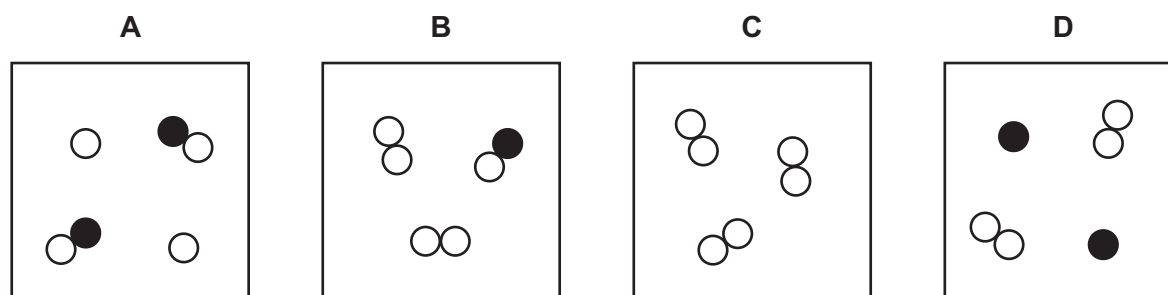
- A** 1 and 3 **B** 2 and 4 **C** 3 and 4 **D** 4 only

13 What are undesirable effects of deforestation?

- 1 extinction of species
- 2 flooding
- 3 loss of soil
- 4 an increase of carbon dioxide in the atmosphere

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

14 Which diagram represents a mixture of two different elements?

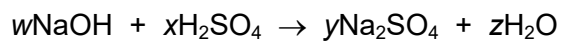


15 Potassium and iodine react together to form potassium iodide, KI.

Which statement is correct?

- A** Ionic bonds form between neutral ions.
B The potassium and iodine atoms share a pair of electrons to form a covalent bond.
C The potassium and iodine atoms share a pair of electrons to form an ionic bond.
D The potassium atom loses an electron to form a positive ion.

- 16 The unbalanced equation for the reaction between aqueous sodium hydroxide and dilute sulfuric acid is shown.

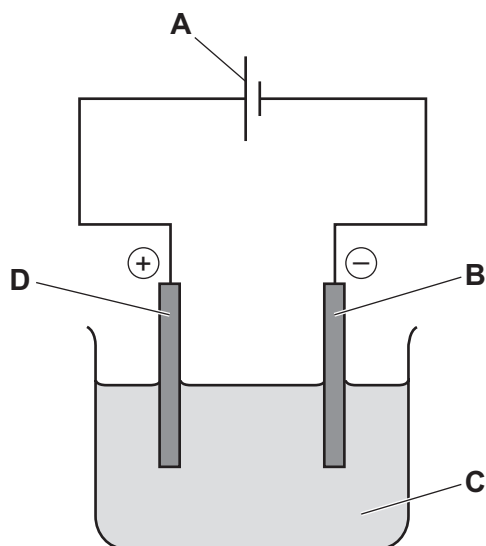


Which values of w , x , y and z balance the equation?

	w	x	y	z
A	2	1	1	2
B	2	1	2	1
C	1	1	1	1
D	1	2	1	1

- 17 The diagram shows electrolysis apparatus.

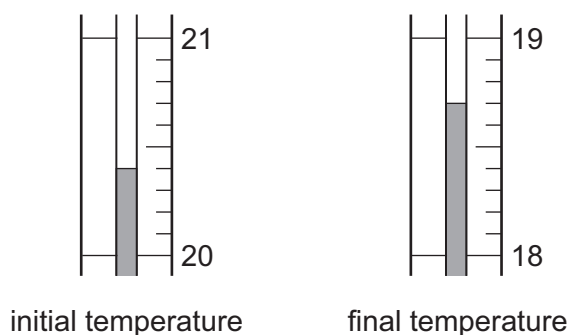
Which label shows the cathode?



18 The initial temperature of a sample of water is measured.

Ammonium nitrate is mixed with the water. The final temperature is measured.

The diagram shows the thermometer readings.



Which row shows the initial temperature, the final temperature and the type of reaction that occurs?

	initial temperature / °C	final temperature / °C	type of reaction
A	20.4	18.7	endothermic
B	20.4	18.7	exothermic
C	21.6	19.3	endothermic
D	21.6	19.3	exothermic

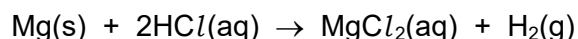
19 The evaporation of ethanol is an example of a 1..... change because 2..... .

Which words complete gaps 1 and 2?

	1	2
A	chemical	a gas is produced
B	chemical	no new compound is formed
C	physical	a gas is produced
D	physical	no new compound is formed

- 20** Magnesium is added to excess dilute hydrochloric acid.

The equation for the reaction is shown.



Which change in conditions increases the rate of this reaction?

- A** Use a larger volume of dilute hydrochloric acid.
 - B** Use larger pieces of the same mass of magnesium.
 - C** Warm the dilute hydrochloric acid before adding the magnesium.
 - D** Add water to the hydrochloric acid before adding the magnesium.
- 21** Which description explains why a reaction involves reduction?
- A** mass decreases
 - B** oxygen is lost
 - C** pH decreases
 - D** temperature decreases
- 22** Which number determines the order of elements in the Periodic Table?
- A** neutron number
 - B** nucleon number
 - C** proton number
 - D** relative atomic mass
- 23** Which statements about transition elements are correct?
- 1 They are in Group I of the Periodic Table.
 - 2 They form coloured compounds.
 - 3 They often act as catalysts.
 - 4 They have low melting points.
- A** 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

24 Which statement explains why aluminium is extracted from its ore by electrolysis and **not** by heating with carbon?

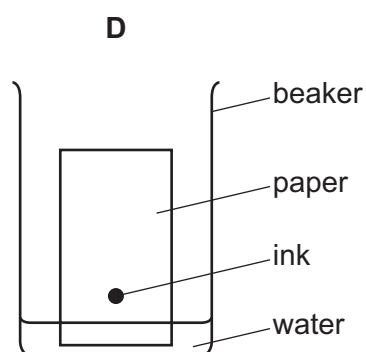
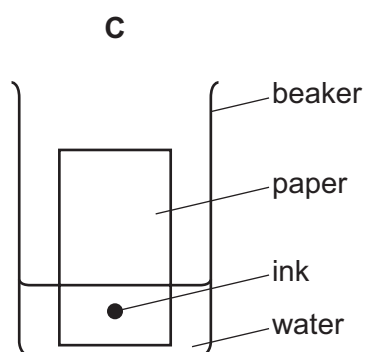
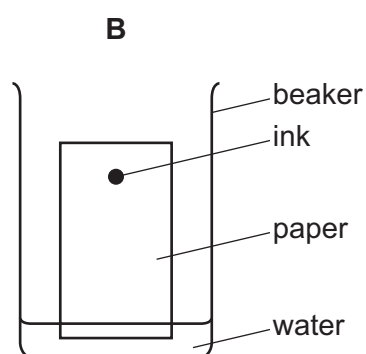
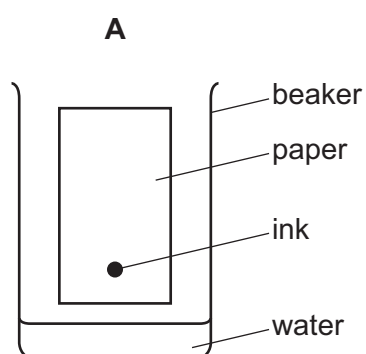
- A** Aluminium is more reactive than carbon.
- B** Aluminium is more reactive than hydrogen.
- C** Aluminium melts at 660°C .
- D** Aluminium resists corrosion.

25 Which piece of apparatus is used to measure exactly 20.6 cm^3 of water?

- A** measuring cylinder
- B** burette
- C** graduated beaker
- D** syringe

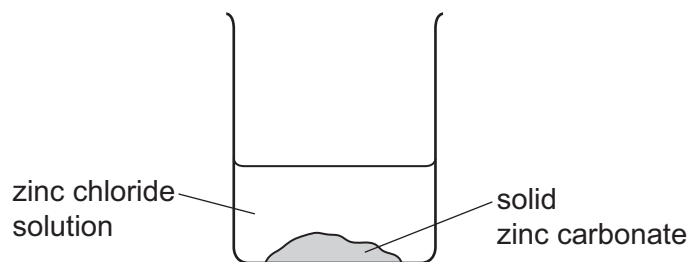
26 Chromatography separates ink into different colours.

Which diagram shows how the apparatus is set up?



- 27** Excess solid zinc carbonate is added to dilute hydrochloric acid in a beaker.

When the reaction is complete, the beaker contains a mixture of unreacted solid zinc carbonate in a solution of zinc chloride.



Which processes are used to obtain crystals of zinc chloride from this mixture?

- A** filtration and distillation
 - B** filtration and evaporation
 - C** filtration and oxidation
 - D** oxidation and evaporation
- 28** A student determines the density of a small, irregularly shaped rock.

Which apparatus does the student use?

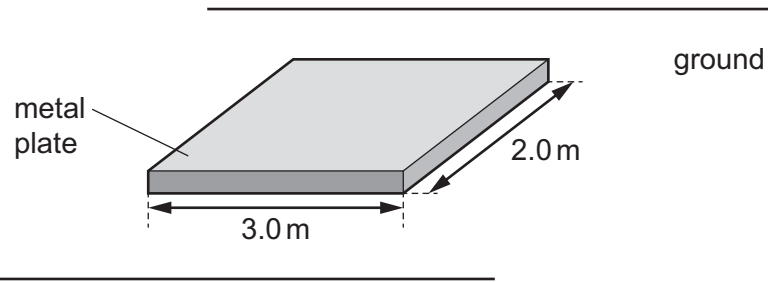
- A** balance, measuring cylinder and ruler
 - B** balance and measuring cylinder only
 - C** balance and ruler only
 - D** measuring cylinder and ruler only
- 29** The same object is moved using four different sets of conditions.

The force used, the time taken and the distance moved are measured for each set of conditions.

Which row shows the set of conditions that gives the greatest power?

	force / N	time taken / s	distance moved / m
A	200	20	2.0
B	200	40	3.0
C	400	10	3.0
D	400	30	2.0

- 30 A metal plate is 3.0 m long and 2.0 m wide.



The metal plate has a weight of 30 N and rests on the ground.

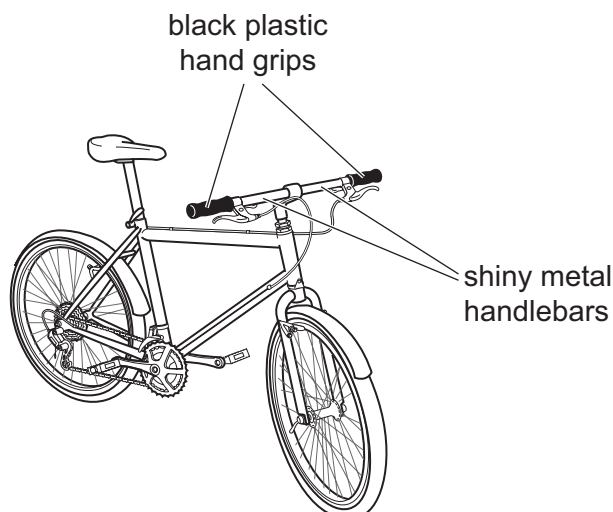
Which pressure does the metal plate exert on the ground?

- A** 5.0 Pa **B** 6.0 Pa **C** 150 Pa **D** 180 Pa
- 31 A bowl contains warm water. The water evaporates.

Which row describes where the evaporation occurs and the effect of the evaporation on the temperature of the remaining water?

	where evaporation occurs	temperature of remaining water
A	only on the surface	decreases
B	only on the surface	does not change
C	throughout the water	decreases
D	throughout the water	does not change

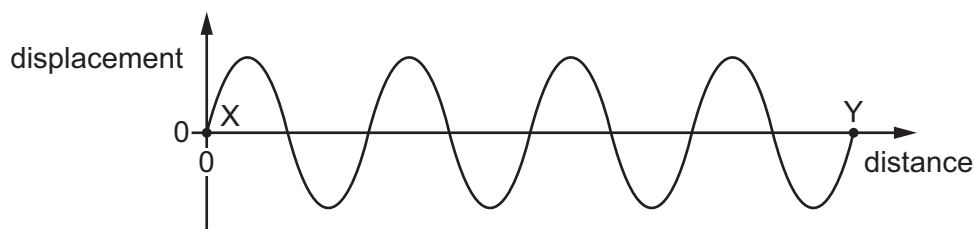
- 32 The shiny metal handlebars of a bicycle have black plastic hand grips.



On a cold day, the shiny metal handlebars feel colder than the black plastic hand grips.

Which statement explains why they feel different?

- A Metal is a better thermal conductor than plastic.
 - B Plastic is a better thermal conductor than metal.
 - C The black plastic hand grips are better emitters of radiation than the shiny metal handlebars.
 - D The shiny metal handlebars are better emitters of radiation than the black plastic hand grips.
- 33 How is thermal energy transferred by convection in a liquid?
- A by the loss of more energetic particles from the surface of the liquid
 - B by a flow of particles of the liquid
 - C by electromagnetic waves in the liquid
 - D by a vibration of particles of the liquid
- 34 The diagram shows part of a wave. Two points are labelled X and Y.



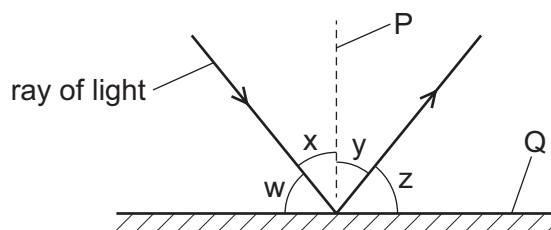
There are four wavelengths between X and Y. In 2.0 s, all four wavelengths pass point Y.

What is the frequency of the wave?

- A 0.50 Hz
- B 2.0 Hz
- C 4.0 Hz
- D 8.0 Hz

- 35 The diagram shows a ray of light reflected by a plane mirror.

Four angles, w , x , y and z , are labelled. Two lines, P and Q , are labelled.



Which row shows the labels for the angle of incidence, the angle of reflection and the normal?

	angle of incidence	angle of reflection	normal
A	w	z	P
B	w	z	Q
C	x	y	P
D	x	y	Q

- 36 An astronaut is outside a space station in the vacuum of space. The astronaut is wearing a spacesuit.

A second astronaut is inside the space station. This astronaut makes a knocking sound against the inside metal walls of the space station.

Which statement explains why the astronaut outside the space station does **not** hear this sound?

- A** Sound cannot travel through the air inside the space station.
 - B** Sound cannot travel through the metal walls of the space station.
 - C** Sound cannot travel through the spacesuit of the astronaut.
 - D** Sound cannot travel through the vacuum outside the space station.
- 37 An electrical device has a label with the information shown.

$50\text{ W}, 1100\ \Omega, 230\text{ V}$

Which information does the label provide?

- A** current, power and resistance
- B** current, power and voltage
- C** current, resistance and voltage
- D** power, resistance and voltage

38 Which equation relates the resistance R of a resistor to the current I in the resistor and the voltage V across the resistor?

A $R = \frac{I}{V}$

B $R = IV$

C $R = \frac{1}{(IV)}$

D $R = \frac{V}{I}$

39 Which electrical device is used to protect a circuit?

A ammeter

B battery

C fuse

D voltmeter

40 What is a description of the Sun and what does the Sun mostly consist of?

	description	mostly consists of
A	small mass star	hydrogen and helium
B	small mass star	hydrogen and oxygen
C	large mass star	hydrogen and helium
D	large mass star	hydrogen and oxygen

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The Periodic Table of Elements

Group																				
I	II	1 H hydrogen 1										III	IV	V	VI	VII	VIII			
		Key atomic number atomic symbol name relative atomic mass																		
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		
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		
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 —		



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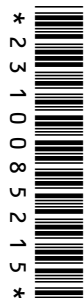
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INFORMATION

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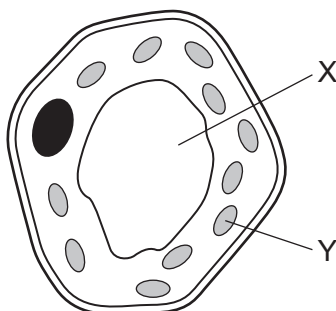
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1 Which word describes the removal of waste products and substances in excess of requirements from an organism?

- 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

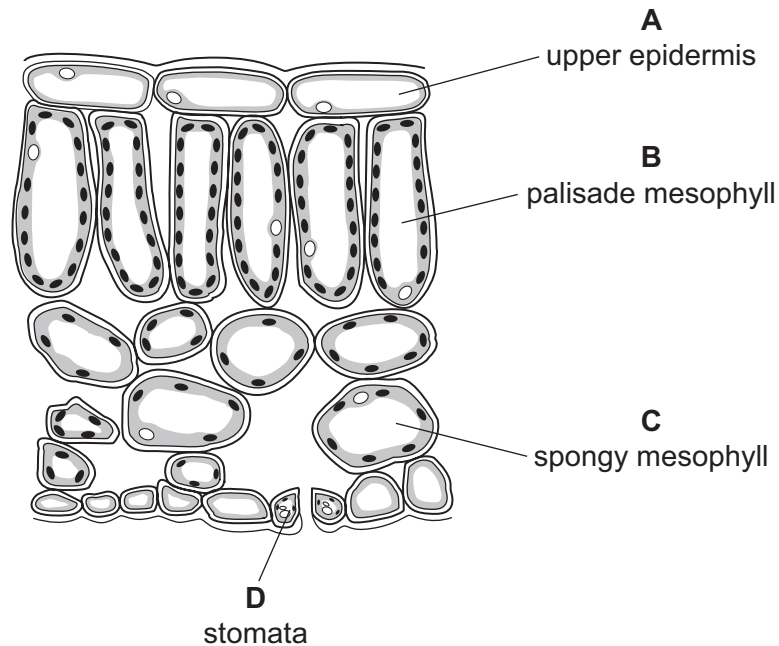
3 Oxygen gas moves into red blood cells from the alveoli.

What is this process?

- A diffusion
- B evaporation
- C osmosis
- D transpiration

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

Which label is **not** correct?



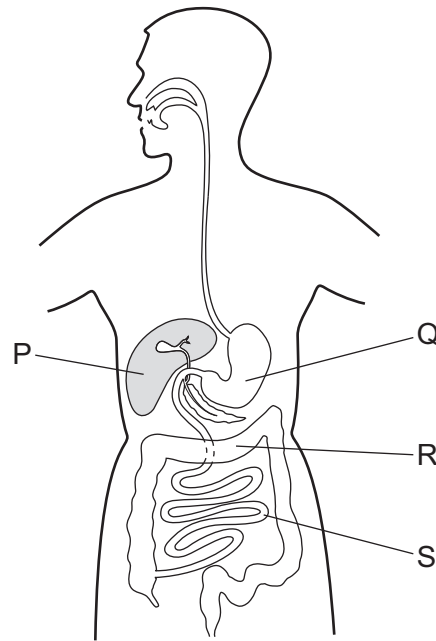
- 5 What are the chemical elements in an enzyme?

- 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.

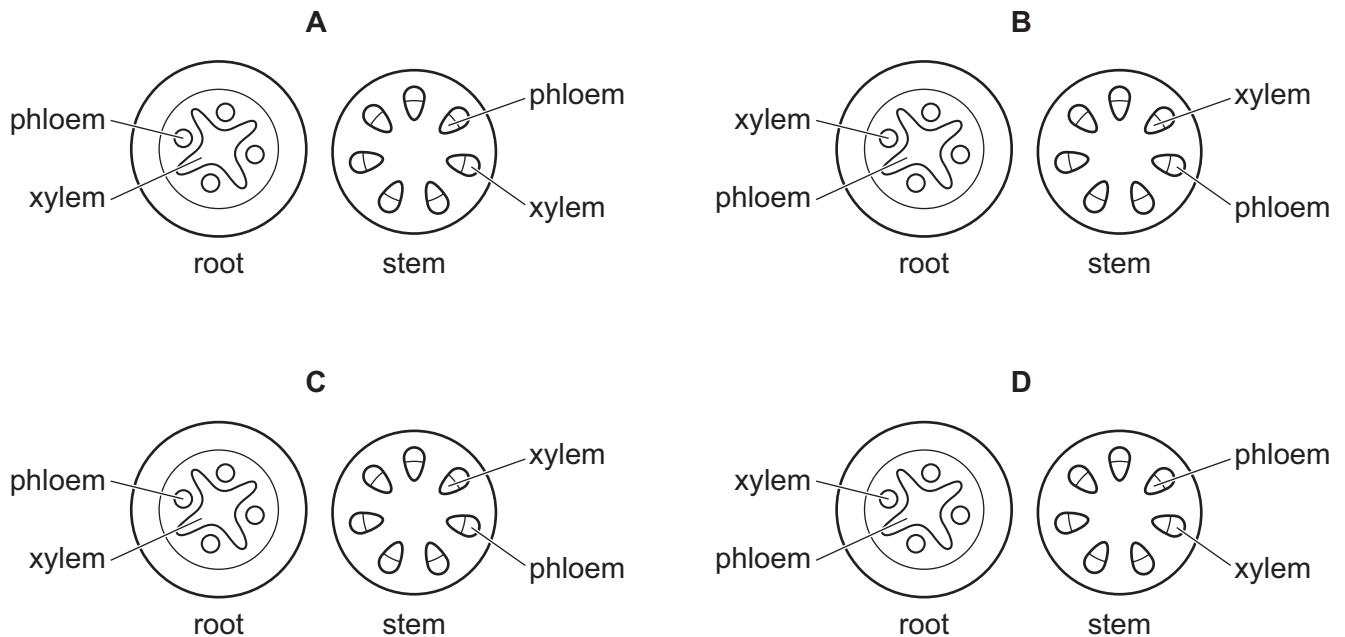


Which row shows the labels for parts P, Q, R and S?

	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

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?



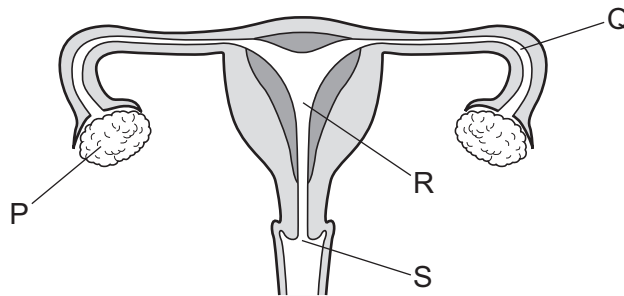
9 Which molecules are required for aerobic respiration?

- 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

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.

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?

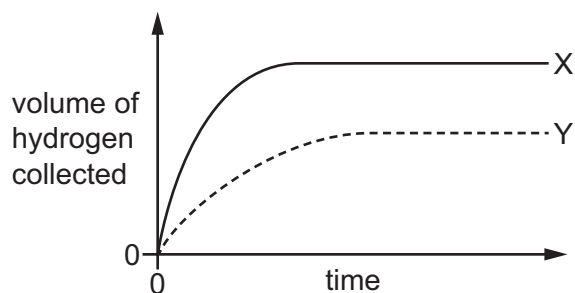
	initial temperature / °C	final temperature / °C
A	21	19
B	20	22
C	19	18
D	18	23

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

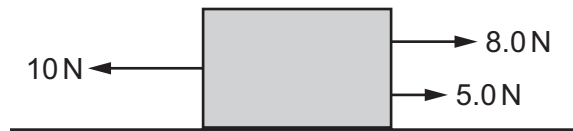
28 A solid block has mass m and weight W .

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** $\frac{W}{V}$

- 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?

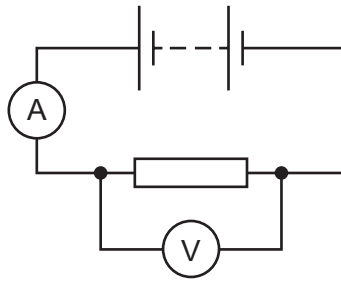
- A** 0 s **B** 0.50 s **C** 1.0 s **D** 2.0 s

- 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

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

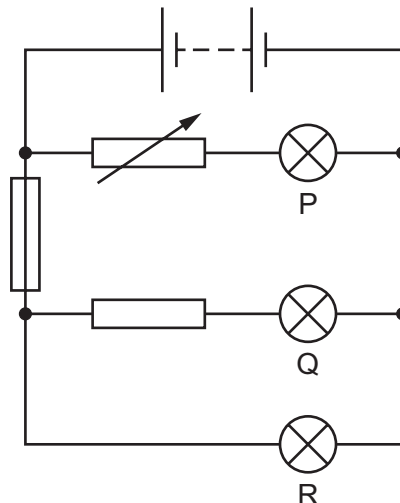
38 The voltage across a lamp is 10 V. The current in the lamp is 0.010 A.

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

- 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			
		1 H hydrogen 1																		
		Key atomic number atomic symbol name relative atomic mass																		
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		
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	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 —	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 —			

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
		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 dm³ at room temperature and pressure (r.t.p.).



Cambridge IGCSE™

COMBINED SCIENCE

Paper 1 Multiple Choice (Core)

0653/13

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.

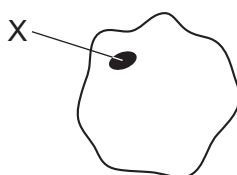
This document has **16** pages. Any blank pages are indicated.



1 Which row shows substances that are removed by the process of excretion?

	substances in excess of requirements	waste products	undigested food
A	x	✓	✓
B	✓	x	✓
C	✓	✓	x
D	✓	✓	✓

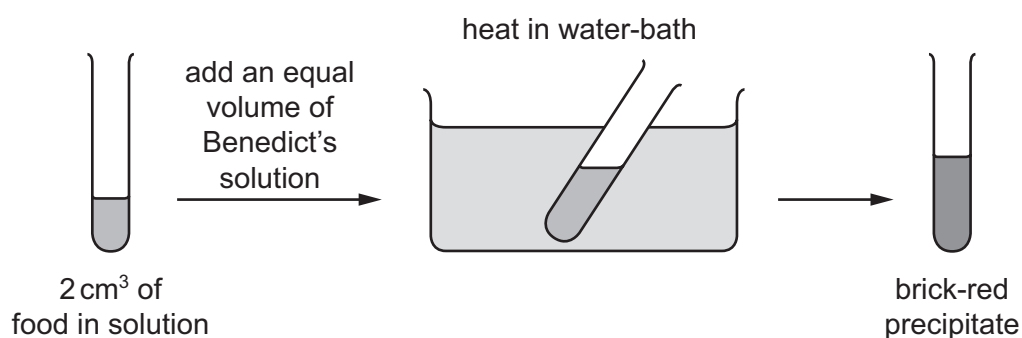
2 The diagram shows an animal cell.



What is the function of part X?

- A** to carry out photosynthesis
- B** to let molecules in and out of the cell
- C** to store and pass on genetic information
- D** to support and protect the cell

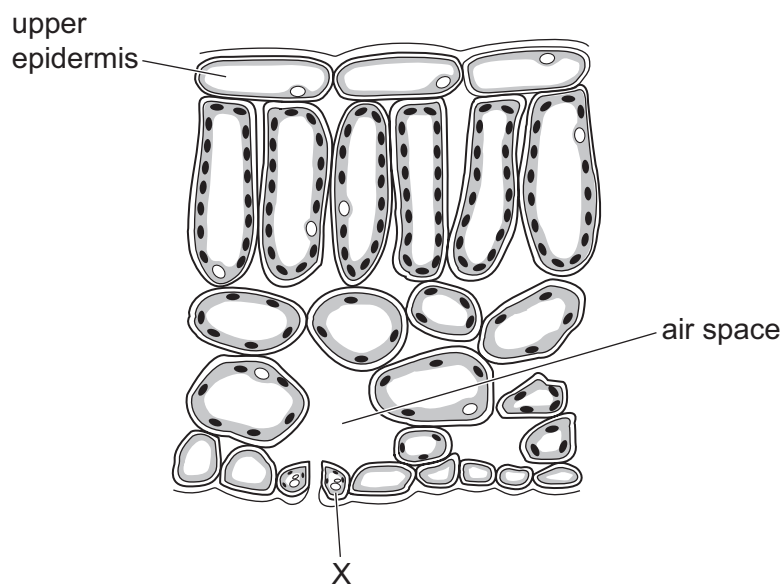
3 The diagram shows a food test on some food in solution.



Which biological molecule does the food test show that the food in solution contains?

- A** fat
- B** protein
- C** reducing sugar
- D** starch

- 4 What function as biological catalysts?
- A antibodies
 - B enzymes
 - C hormones
 - D platelets
- 5 Which substance is required for photosynthesis to occur?
- A chlorophyll
 - B glucose
 - C haemoglobin
 - D oxygen
- 6 The diagram shows a section through a leaf.



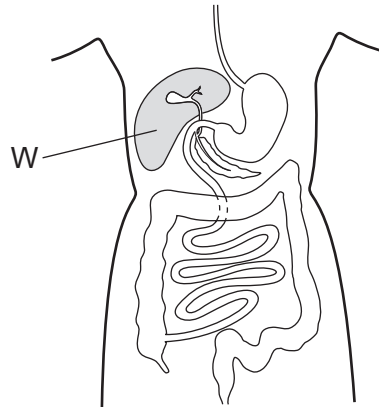
What is the structure labelled X?

- A guard cell
- B palisade mesophyll
- C phloem
- D xylem

7 What is meant by a balanced diet in humans?

- A** a diet that contains a lot of fibre to aid food passing through the alimentary canal
- B** a diet that has only enough of each food group for the body to maintain good health
- C** every meal contains all the main food groups
- D** each food group is present in excessive amounts

8 The diagram shows part of the human alimentary canal and associated organs.



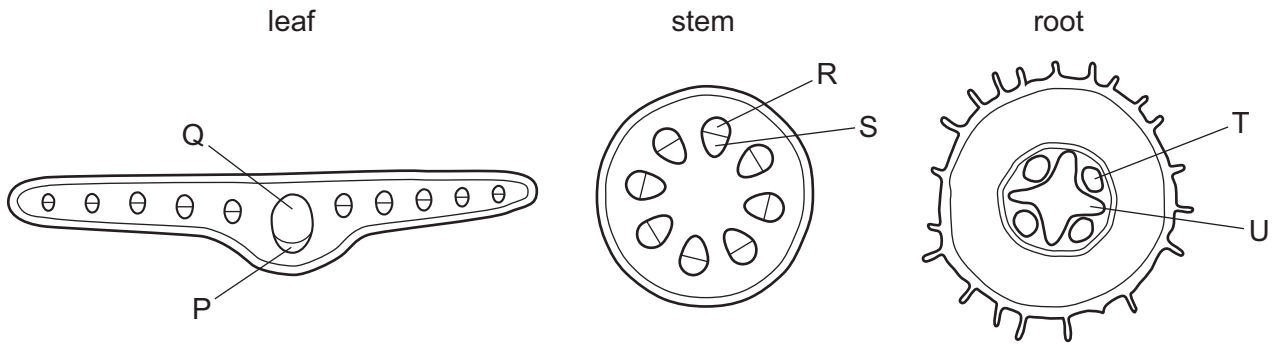
What is the organ labelled W?

- A** gall bladder
- B** liver
- C** oesophagus
- D** stomach

9 Which row shows what happens to soluble food molecules after food is chemically digested?

	name of process	what happens to soluble food molecules
A	ingestion	pass through the blood into the wall of the intestine
B	ingestion	pass through the wall of the intestine into the blood
C	absorption	pass through the blood into the wall of the intestine
D	absorption	pass through the wall of the intestine into the blood

10 The diagrams show sections through different parts of a dicotyledonous plant.



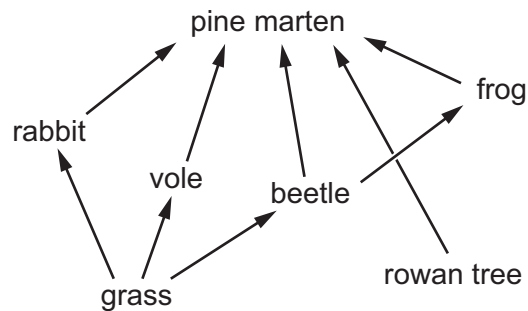
Which tissues transport water through the plant?

- A** P, R and T **B** P, S and U **C** Q, R and T **D** Q, S and U

11 Which part of the female reproductive system matches its function?

	part of the female reproductive system	function
A	cervix	ring of muscle at the opening of the uterus
B	ovaries	the site of fertilisation
C	oviducts	where sperm is deposited
D	uterus	release of female gametes

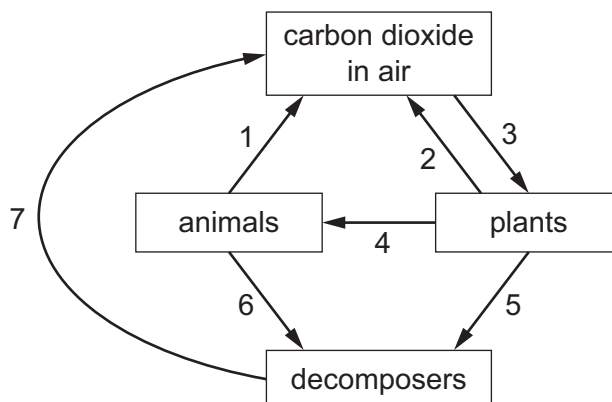
12 The diagram shows a food web.



Which row is correct for this food web?

	herbivore	carnivore	producer
A	frog	beetle	grass
B	frog	pine marten	rowan tree
C	beetle	vole	rowan tree
D	vole	frog	grass

13 The diagram represents part of the carbon cycle.



Which arrows represent respiration?

- A** 1, 2 and 4 **B** 1, 2 and 7 **C** 3, 5 and 6 **D** 3, 6 and 7

14 Which electronic configuration represents a noble gas?

- A** 2 **B** 2,1 **C** 2,2 **D** 2,3

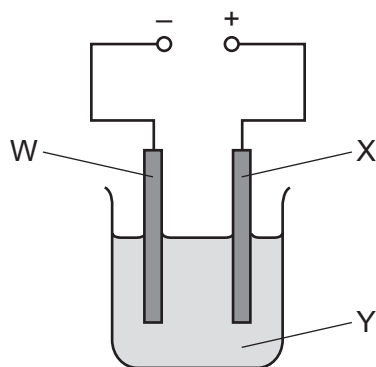
15 What happens when a sodium atom reacts with a chlorine atom?

- A** The sodium atom and chlorine atom lose electrons.
B The sodium atom gains an electron and the chlorine atom loses an electron.
C The sodium atom loses an electron and the chlorine atom gains an electron.
D The sodium atom shares electrons with the chlorine atom.

16 What is produced when calcium reacts with dilute hydrochloric acid?

- A** calcium chloride + hydrogen
B calcium chloride + water
C calcium hydroxide + chlorine
D calcium hydroxide + hydrogen

17 The diagram shows the apparatus for electrolysis.



Which row identifies W, X and Y?

	W	X	Y
A	anode	cathode	electrolyte
B	anode	cathode	power supply
C	cathode	anode	electrolyte
D	cathode	anode	power supply

18 Magnesium ribbon is added to dilute hydrochloric acid at 20 °C.

The mixture starts to fizz and the temperature increases to 32 °C.

The fizzing then stops and the temperature slowly decreases until it reaches 20 °C. The temperature then remains constant.

Which statement is correct?

- A** The reaction is endothermic.
- B** The reaction is exothermic.
- C** There is an endothermic reaction followed by an exothermic reaction.
- D** There is an exothermic reaction followed by an endothermic reaction.

19 Which process results in a chemical change?

- A** Heat liquid water to form steam.
- B** Mix powdered carbon and iron filings.
- C** Melt iron filings.
- D** Heat sulfur in air to make sulfur dioxide.

20 Which substance contains a covalent bond between two different elements?

- A chlorine
- B potassium chloride
- C hydrogen
- D hydrogen chloride

21 Universal indicator is placed into a colourless liquid. The colour change of the universal indicator shows that the pH of the liquid is 6.

Which statement about the colourless liquid is correct?

- A It is an acid that turns the universal indicator red.
- B It is an acid that turns the universal indicator yellow.
- C It is an alkali that turns the universal indicator blue.
- D It is a neutral liquid that turns the universal indicator green.

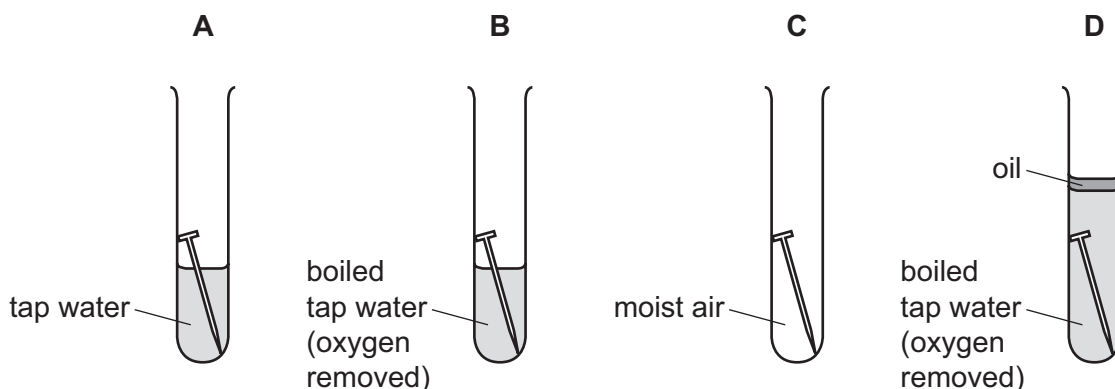
22 Sodium nitrate, NaNO_3 , is a soluble salt.

Which method is used to make pure solid sodium nitrate?

- A Add aqueous sodium hydroxide to a conical flask, titrate with dilute nitric acid, then crystallise.
- B Dissolve solid sodium chloride in dilute nitric acid, leave for 10 minutes and then crystallise.
- C Heat sodium with nitrogen and oxygen. Let the mixture cool, then collect the solid that is made.
- D Mix copper nitrate and sodium chloride solutions, then filter the mixture and collect the sodium nitrate from the filter paper.

23 Iron nails are placed in four test-tubes under different conditions and left for two weeks.

In which test-tube does the iron nail show the least amount of rust?



24 Brass is an alloy.

Which statement describes brass?

- A** Brass is made of pure copper.
- B** Brass is a mixture of copper and zinc.
- C** Brass is a mixture of lead and tin.
- D** Brass is made of pure zinc.

25 In the blast furnace, iron(III) oxide reacts with carbon monoxide to form iron.

What happens to the iron(III) oxide?

- A** It is oxidised by gaining oxygen.
- B** It is oxidised by losing oxygen.
- C** It is reduced by gaining oxygen.
- D** It is reduced by losing oxygen.

26 A sample of solid sodium chloride is mixed with water and stirred. The sodium chloride dissolves.

Which name describes the solid sodium chloride?

- A** solution
- B** solvent
- C** solute
- D** insoluble salt

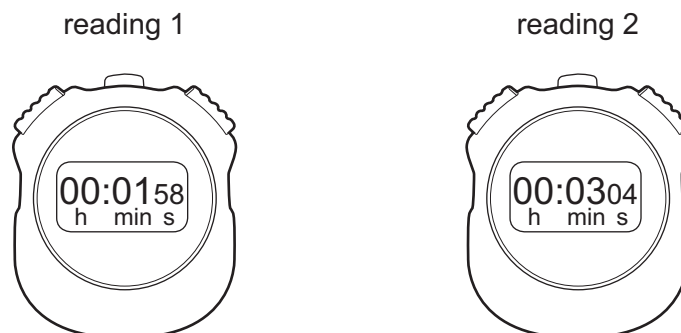
27 Separate samples of the gases ammonia, chlorine, hydrogen and oxygen are tested with damp blue litmus paper.

How many of these gases change the colour of the litmus paper?

- A** 0
- B** 1
- C** 2
- D** 3

- 28 A stop-watch is used to record the time at two points in a race.

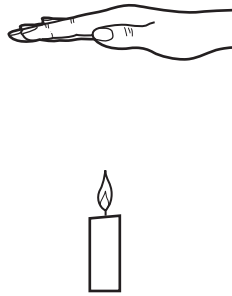
The diagram shows the readings.



What is the difference in time between reading 1 and reading 2?

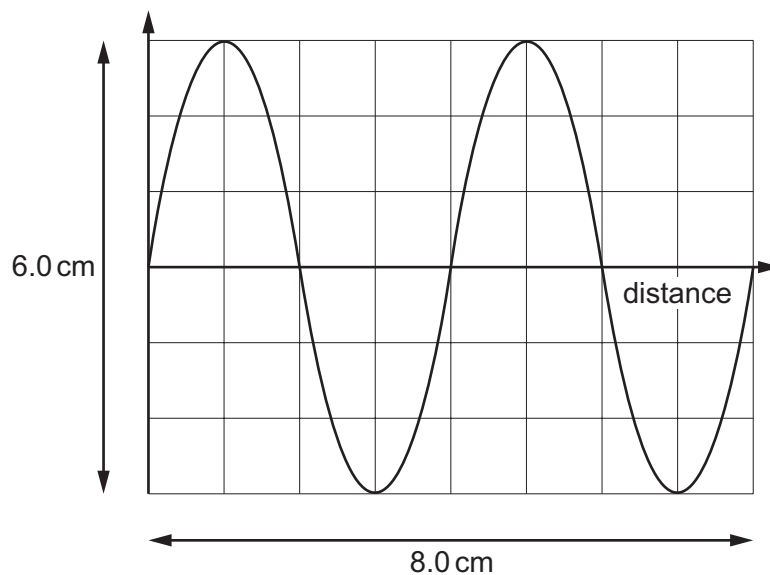
- A 66 s B 104 s C 146 s D 302 s
- 29 Which expression is the definition of density?
- A $\frac{\text{mass}}{\text{volume}}$ B $\frac{\text{volume}}{\text{mass}}$ C $\frac{\text{volume}}{\text{weight}}$ D $\frac{\text{weight}}{\text{volume}}$
- 30 A car is powered by a petrol engine.
- The car accelerates from rest along a horizontal road.
- Which energy transfer occurs?
- A electrostatic → kinetic
 B electrostatic → gravitational potential
 C chemical → kinetic
 D chemical → gravitational potential
- 31 Two cylinders contain the same type of gas.
- The gas in one cylinder is at a higher temperature than the gas in the other cylinder.
- Which statement **must** be correct?
- A In one cylinder, there are more gas particles.
 B In one cylinder, the gas occupies a smaller volume.
 C In one cylinder, the gas particles are further apart.
 D In one cylinder, the gas particles move faster.

- 32 The diagram shows a hand above a candle flame.



What is the main method by which thermal energy is transferred from the flame to the hand?

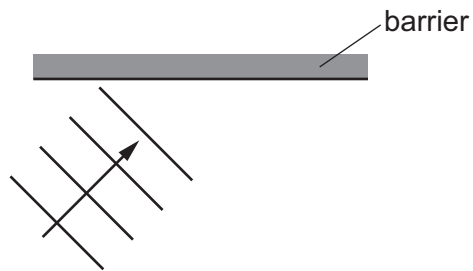
- A conduction
 - B convection
 - C evaporation
 - D radiation
- 33 What is the main region of the electromagnetic spectrum involved in thermal energy transfer from the Sun to the Earth?
- A gamma
 - B infrared
 - C microwave
 - D X-ray
- 34 The diagram represents a wave.



What is the wavelength of the wave?

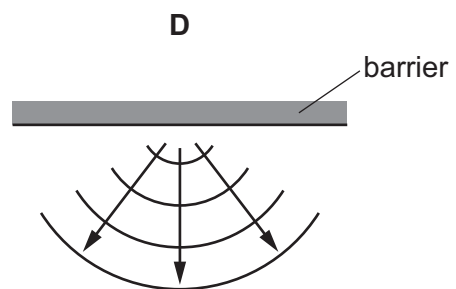
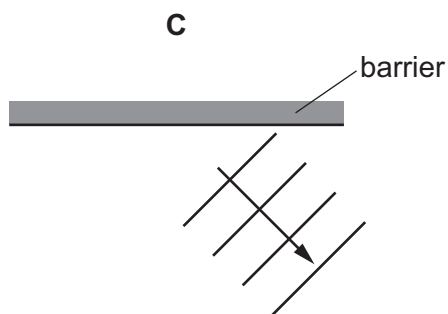
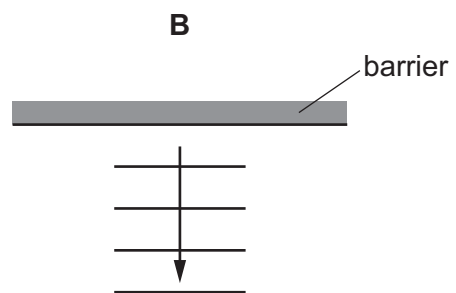
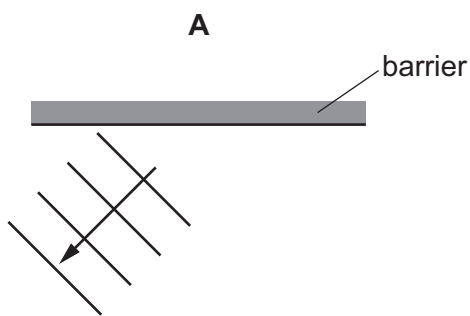
- A 3.0 cm
- B 4.0 cm
- C 6.0 cm
- D 8.0 cm

- 35** The diagram shows a wave on water moving towards a straight barrier. The direction of the wave is shown by an arrow.

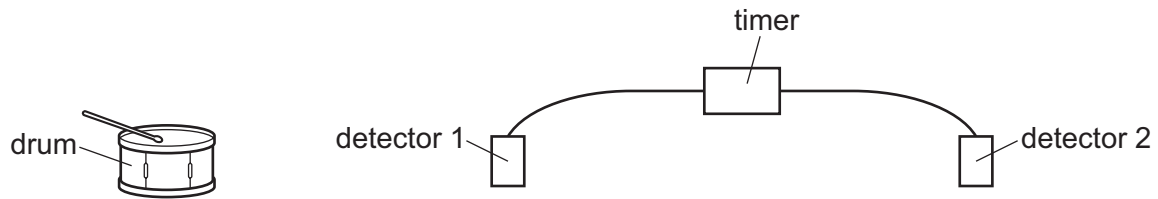


The wave reflects from the barrier.

Which diagram shows the reflected wave?



36 A student uses electronic equipment to determine the speed of sound in air.



The student hits the drum once.

When the sound reaches detector 1, the timer starts. When the sound reaches detector 2, the timer stops.

Which distance is needed to calculate the speed of sound in air?

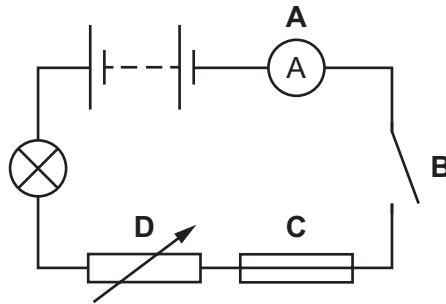
- A** the distance from detector 1 to detector 2
- B** the distance from detector 1 to the timer
- C** the distance from the drum to detector 2
- D** the distance from the drum to the timer

37 Which equations for power and energy transferred in an electrical component are correct?

	power	energy
A	$P = \frac{V}{I}$	$E = \frac{IV}{t}$
B	$P = \frac{V}{I}$	$E = IVt$
C	$P = IV$	$E = \frac{IV}{t}$
D	$P = IV$	$E = IVt$

38 When the switch in the circuit shown is closed, the lamp glows dimly.

Which labelled component is adjusted to make the lamp glow more brightly?



39 The current in a kettle is 8.4 A.

Which fuse rating is appropriate for a fuse used to protect the kettle?

- A** 5 A **B** 8 A **C** 13 A **D** 30 A

40 How many stars are there in the Solar System?

- A** 1 **B** 2 **C** 8 **D** 9

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	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 dm³ at room temperature and pressure (r.t.p.).