



Cambridge IGCSE™

COMBINED SCIENCE

Paper 1 Multiple Choice (Core)

0653/11

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.

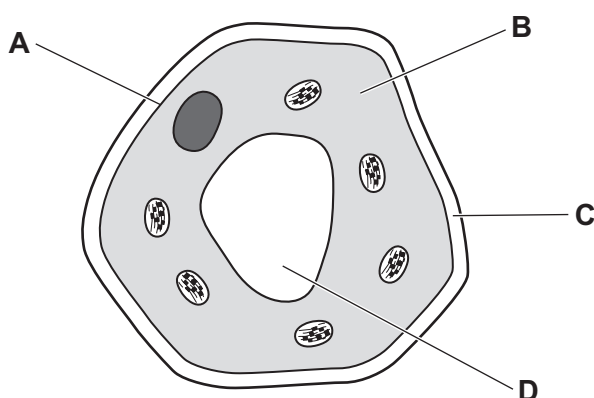


- 1 One characteristic of living organisms is to detect and respond to changes in the environment.

What is this characteristic?

- A growth
- B movement
- C reproduction
- D sensitivity

- 2 Which structure stops the cell from bursting when the cell is placed in distilled water?



- 3 A sample of food turns Benedict's solution brick-red.

Which row shows the molecule the food contains and all the chemical elements in the molecule?

	molecule	chemical elements
A	protein	carbon, nitrogen and oxygen
B	glucose	hydrogen, carbon and nitrogen
C	glucose	hydrogen, carbon and oxygen
D	protein	hydrogen, nitrogen and oxygen

- 4 Which statement about biological catalysts is correct?

- A They are proteins that increase the rate of a reaction.
- B They are **not** affected by changes in pH.
- C They can only function outside animal cells.
- D They work fastest at very high temperatures.

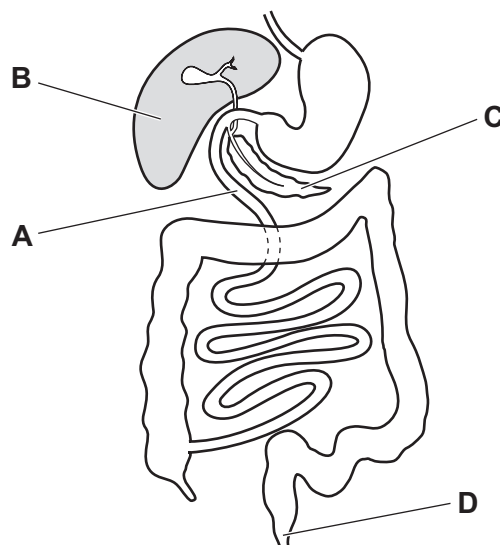
5 Which process do plants use to manufacture carbohydrates using light energy?

- A absorption
- B photosynthesis
- C respiration
- D transpiration

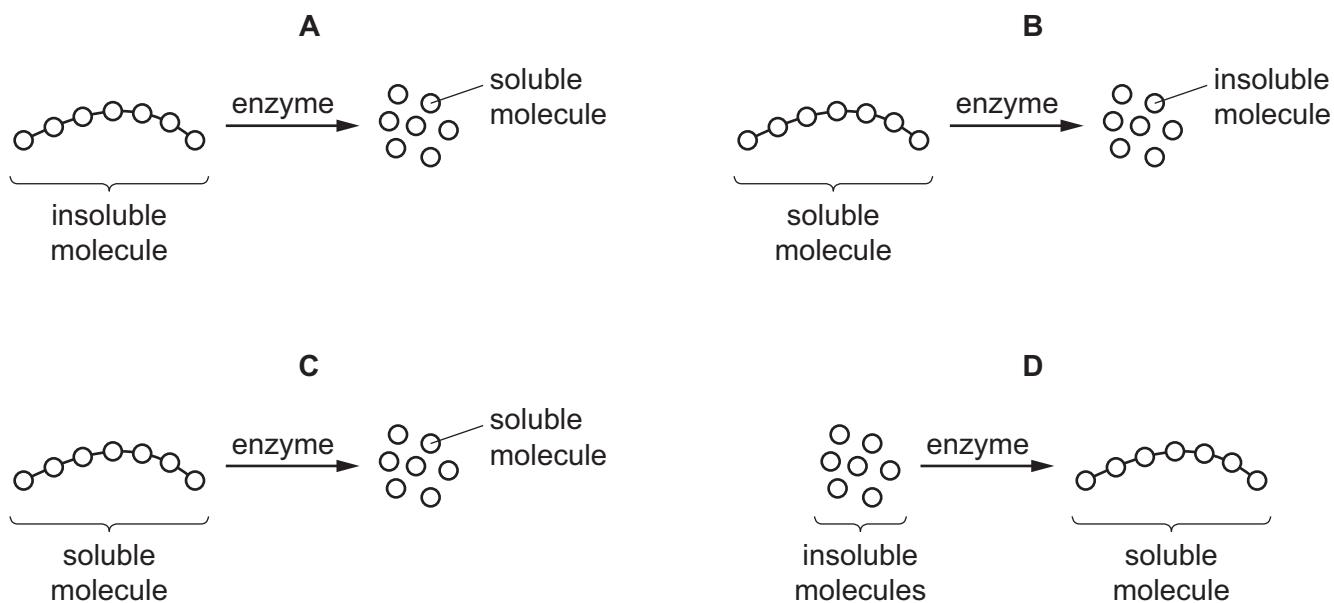
6 Which row matches the type of nutrient with its food source and use in the body?

	nutrient	food source	use
A	calcium	butter	for energy
B	iron	red meat	to make red blood cells
C	vitamin C	milk	to make bones and teeth
D	vitamin D	citrus fruit	for healthy gums

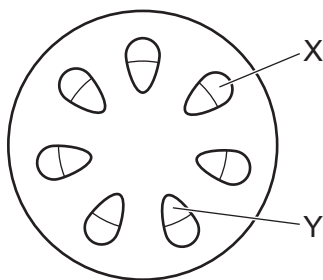
7 Which part of the digestive system carries out both digestion **and** absorption?



8 Which diagram shows the correctly labelled molecules in chemical digestion?



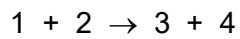
9 The diagram shows a section through part of a plant.



Which row shows where the section is taken from and which substances are transported by the labelled areas?

	section	X	Y
A	root	sucrose	water
B	root	water	sucrose
C	stem	sucrose	water
D	stem	water	sucrose

10 The equation represents aerobic respiration.

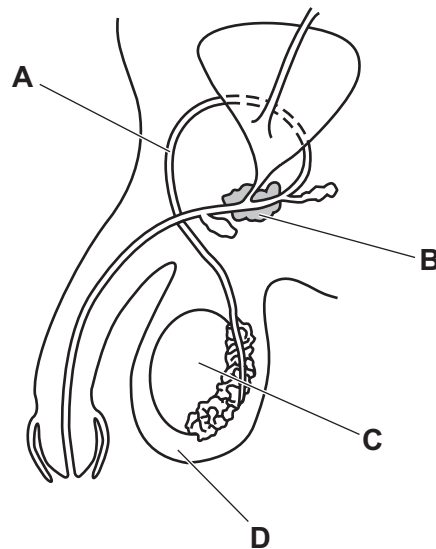


Which row shows the correct equation?

	1	2	3	4
A	carbon dioxide	glucose	oxygen	water
B	glucose	oxygen	water	carbon dioxide
C	oxygen	water	carbon dioxide	glucose
D	water	carbon dioxide	glucose	oxygen

11 The diagram shows the male reproductive system.

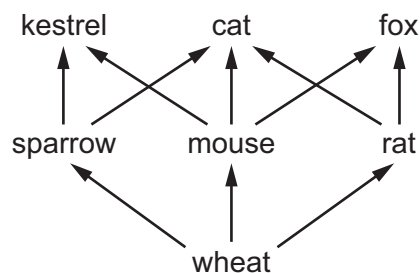
Which structure is the scrotum?



12 In which part of the human female reproductive system does fertilisation normally take place?

- A** ovary
- B** oviduct
- C** uterus
- D** vagina

13 The diagram shows a food web.



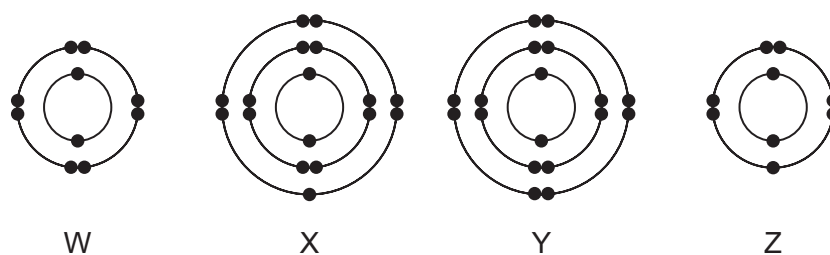
Which statement describes an organism in the food web?

- A The cat is a herbivore and a consumer.
- B The sparrow is a carnivore and a consumer.
- C The mouse is a herbivore and a producer.
- D The kestrel is a carnivore and a consumer.

14 What is the nucleon number of an atom?

- A the total number of protons, neutrons and electrons
- B the total number of protons and neutrons
- C the number of protons only
- D the number of neutrons only

15 Which electronic configurations represent noble gases?



- A W and Y
- B W and Z
- C X and Y
- D X and Z

16 Which process involves a chemical change?

- A condensation
- B evaporation
- C melting
- D oxidation

17 The diagram shows part of the Periodic Table.

Which element is a non-metal?

A simplified periodic table diagram with the following structure:

- Period 1:** Two cells. The left cell contains 'A'. The right cell is empty.
- Period 2:** Eight cells. The first cell is empty. The second cell contains 'B'. The remaining six cells are empty.
- Period 3:** Eight cells. The first six cells are empty. The seventh cell contains 'C'. The eighth cell is empty.
- Period 4:** Eight cells. The first six cells are empty. The seventh cell contains 'D'. The eighth cell is empty.

There is an additional empty cell located above the gap between Period 1 and Period 2, centered between the first and second columns.

18 Which statement describes properties of a transition element?

- A** It has a high melting point, a high density and forms a blue-green chloride.
- B** It has a high melting point, a low density and forms a white chloride.
- C** It has a low melting point, a low density and forms a green chloride.
- D** It has a low melting point, a high density and forms a white chloride.

19 Sodium is added to a container of water and a reaction occurs.

What remains in the container after this reaction has finished?

- A** solid sodium hydroxide
B solid sodium oxide
C aqueous sodium hydroxide
D aqueous sodium oxide

20 Which statements about alloys are correct?

- 1 Alloys are mixtures of non-metals only.
- 2 Alloys are mixtures of a metal with other elements.
- 3 Brass is an alloy.
- 4 Bauxite is an alloy.

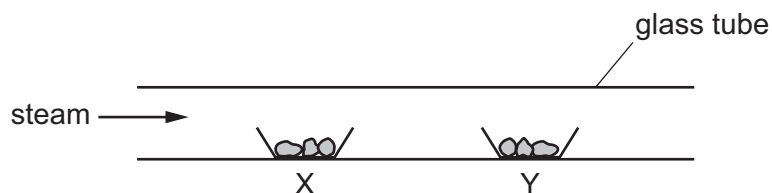
- A** 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

21 Which element is less reactive than hydrogen?

- A** copper
B iron
C magnesium
D zinc

- 22 The diagram shows two open containers, X and Y, inside a glass tube.

Steam passes over the solids in X and Y.



X contains anhydrous copper(II) sulfate.

Y contains anhydrous cobalt(II) chloride.

What is observed?

- A The solid in X remains blue.
 - B The solid in X turns from white to blue.
 - C The solid in Y turns from pink to blue.
 - D The solid in Y turns from pink to white.
- 23 Which volume of air contains about 20 cm^3 of oxygen?
- A 20 cm^3 B 50 cm^3 C 80 cm^3 D 100 cm^3
- 24 What is the main constituent of natural gas?
- A ethane
- B nitrogen
- C methane
- D oxygen
- 25 Pentane is a hydrocarbon.

The word equation for the complete combustion of pentane is shown.

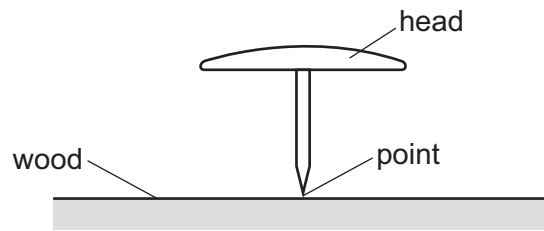


What is substance W?

- A carbon monoxide
- B ethane
- C hydrogen
- D water

- 26 Which statement about alkenes is correct?
- A They are less reactive than alkanes.
 - B They are unsaturated compounds.
 - C They are polymers.
 - D They turn aqueous bromine orange-brown.
- 27 Which method is used to obtain a sample of pure, solid salt from an aqueous solution of the salt?
- A chromatography
 - B crystallisation
 - C filtration
 - D fractional distillation
- 28 A student does an experiment to determine the density of an irregularly shaped solid.
- Which apparatus is used in the experiment?
- A balance, beaker of water, measuring cylinder
 - B balance, beaker of water, thermometer
 - C balance, measuring cylinder, thermometer
 - D beaker of water, measuring cylinder, stop-watch
- 29 The gravitational field strength g on the Moon is 1.6 N/kg .
- A rock has a mass of 2.0 kg .
- What is the weight of the rock on the Moon?
- A 0 N B 0.80 N C 1.6 N D 3.2 N

- 30 The diagram shows a drawing pin (thumb tack) with the head and the point labelled.



The point is placed against a piece of wood. A thumb presses down on the head.

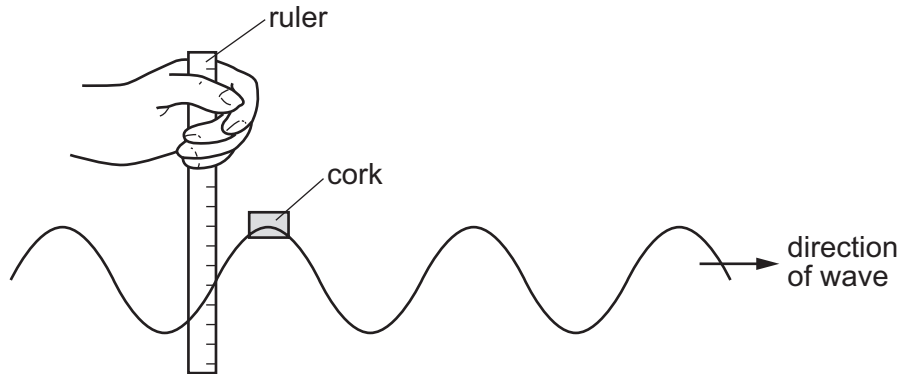
The point goes into the wood. The head does **not** go into the wood.

Which statement is correct?

- A The force on the wood is greater than the force on the thumb.
 - B The force on the wood is smaller than the force on the thumb.
 - C The pressure on the wood is greater than the pressure on the thumb.
 - D The pressure on the wood is smaller than the pressure on the thumb.
- 31 What is a property of a liquid?
- A It always fills the container it is in.
 - B It is always more dense than a solid.
 - C It has a fixed volume.
 - D It has a fixed shape.
- 32 Which materials are both bad thermal conductors?
- A copper and iron
 - B plastic and aluminium
 - C rubber and gold
 - D wood and plastic
- 33 In which states of matter does convection occur?
- A liquid only
 - B liquid and gas
 - C solid and gas
 - D solid and liquid

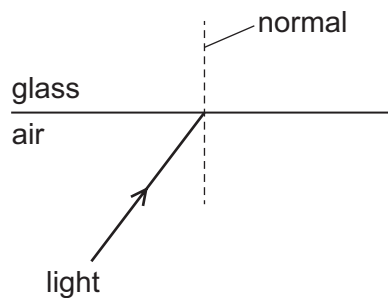
- 34 A cork moves up and down on a wave in a tank of water.

A student measures the distance moved up and down by the cork.



Which quantity can be determined using only this measurement?

- A amplitude
 - B frequency
 - C speed
 - D wavelength
- 35 Light passes from air into glass.



As it enters the glass, the light changes direction.

Which row shows the change in direction of the light and the name of this process?

	change in direction	process
A	away from the normal	dispersion
B	away from the normal	refraction
C	towards the normal	dispersion
D	towards the normal	refraction

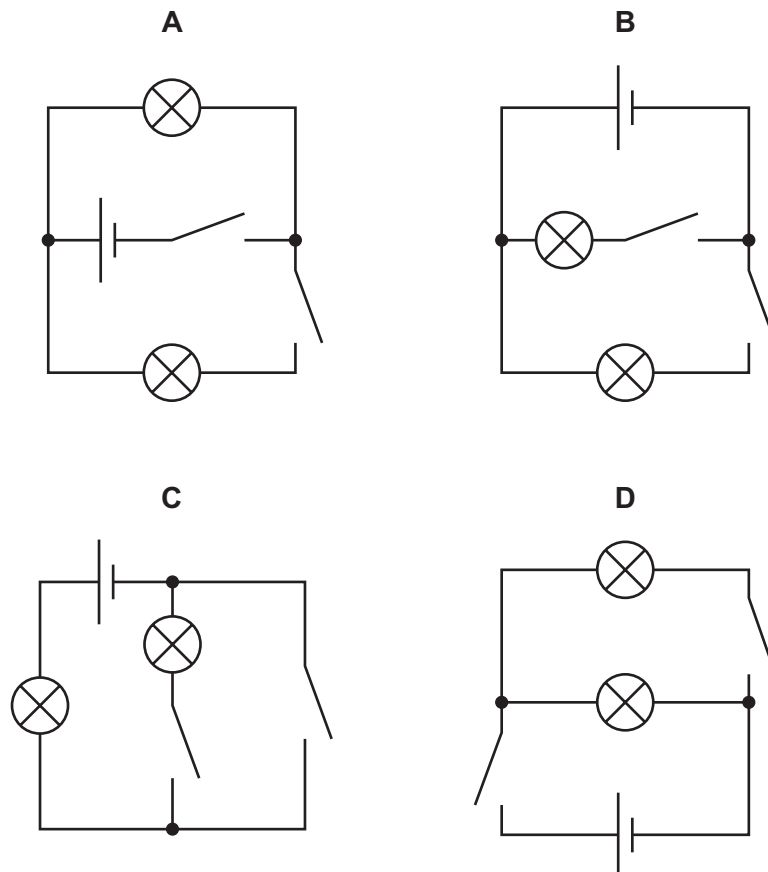
- 36 Which row shows the region of the electromagnetic spectrum with the smallest wavelength and the region with the greatest frequency?

	smallest wavelength	greatest frequency
A	radio waves	gamma rays
B	microwaves	microwaves
C	gamma rays	gamma rays
D	microwaves	radio waves

- 37 Which statement about the current in a resistor, the voltage across the resistor and the resistance of the resistor is correct?

- A** The current in a resistor decreases as the voltage across the resistor increases.
B The current in a resistor increases as the voltage across the resistor increases.
C The resistance of a resistor is given by the expression: $\text{current} \times \text{voltage}$.
D The resistance of a resistor is given by the expression: $\frac{\text{current}}{\text{voltage}}$.

- 38 Which circuit allows the lamps to be switched on and off separately?



39 What is **not** a possible hazard when using mains electrical equipment?

- A** a fuse in a circuit
- B** damaged electrical insulation
- C** damp conditions
- D** overheating of cables in a circuit

40 The speed of light in a vacuum is 3.0×10^8 m/s.

The time taken for light to travel between two objects in space is 50 years.

What is the distance travelled by the light in this time?

- A** 6.0×10^6 m **B** 1.5×10^{10} m **C** 5.5×10^{12} m **D** 4.7×10^{17} m

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



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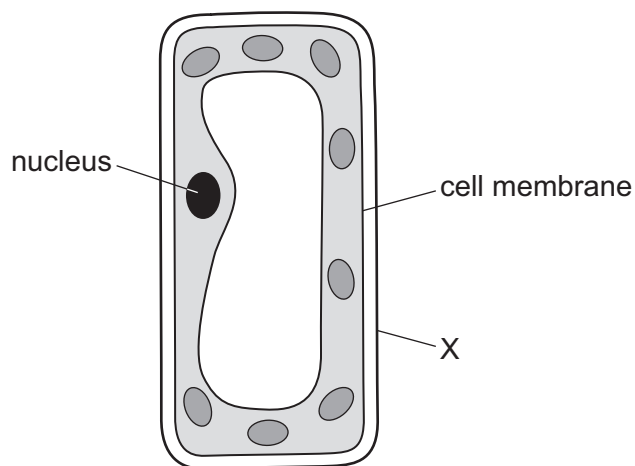
- 1 A student is playing a game of football.

Which characteristics of living organisms does the student show?

- 1 growth
- 2 movement
- 3 respiration
- 4 sensitivity

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

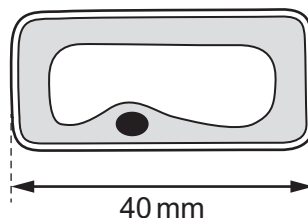
- 2 The diagram shows a plant cell.



Which part of the cell is labelled X?

- A** cell wall
- B** chloroplast
- C** cytoplasm
- D** vacuole

- 3 The diagram shows a scale drawing of a cell.



The actual length of the cell is 0.002 mm.

What is the magnification of the cell?

- A** $\times 20$ **B** $\times 200$ **C** $\times 2000$ **D** $\times 20\,000$

4 Which biological molecule is made from amino acids?

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

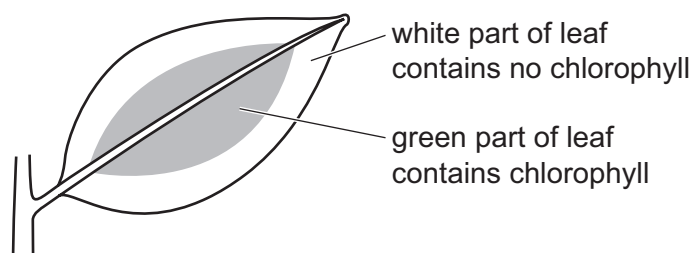
5 The table shows the time taken for an enzyme-controlled reaction to be completed at different temperatures.

temperature / °C	10	20	30	40	50
time taken for reaction to be completed / s	500	360	200	80	240

At which temperature does the enzyme work best?

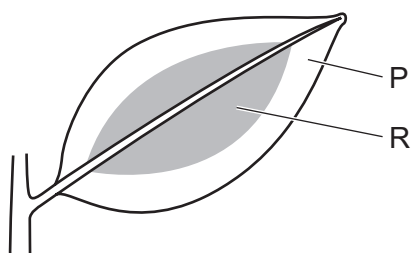
- A 10 °C B 30 °C C 40 °C D 50 °C

- 6 A student investigates the need for chlorophyll in photosynthesis.

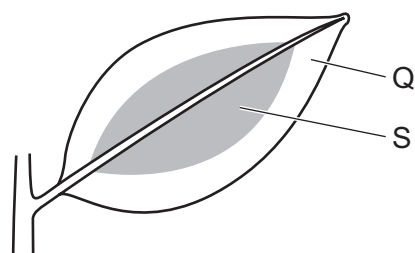


One leaf is placed in the dark and a second leaf is placed in the light for 48 hours.

leaf left in dark



leaf left in light

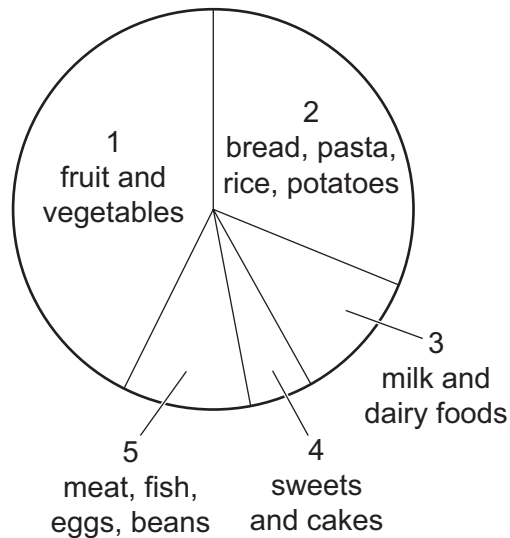


After 48 hours, the student tests the leaves for the presence of starch.

Which row shows the results?

	parts with starch present	parts with no starch present
A	P and Q	R and S
B	P, Q and R	S
C	R and S	P and Q
D	S	P, Q and R

- 7 The diagram shows suggested daily proportions of different dietary food groups.



Which food groups contain the highest amounts of carbohydrate?

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

- 8 In the alimentary canal, chemical digestion breaks down 1..... , ...2..... molecules.

Which words complete gaps 1 and 2?

	1	2
A	large	insoluble
B	large	soluble
C	small	soluble
D	small	insoluble

- 9 What is transpiration?

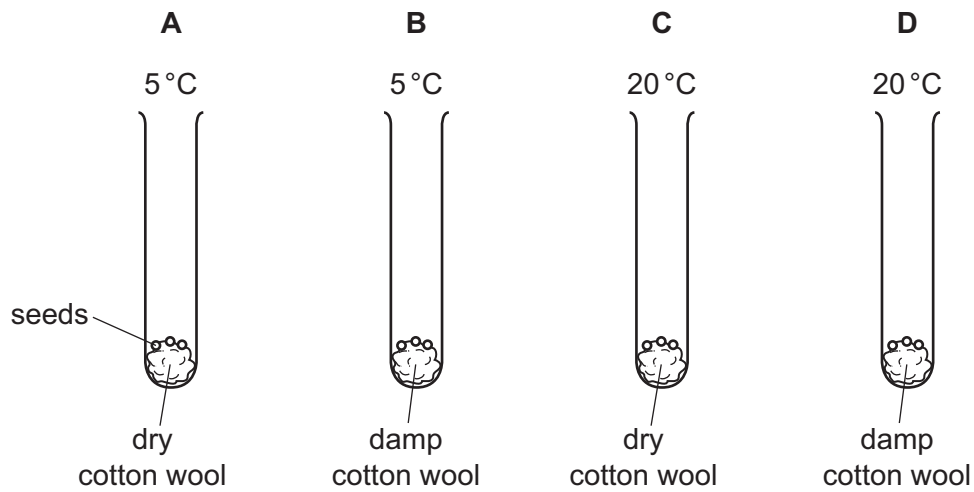
- A** absorption of water by root hair cells
B loss of water vapour from leaves
C loss of water vapour from the roots of plants
D transport of sucrose in the phloem

- 10 What is the word equation for aerobic respiration?

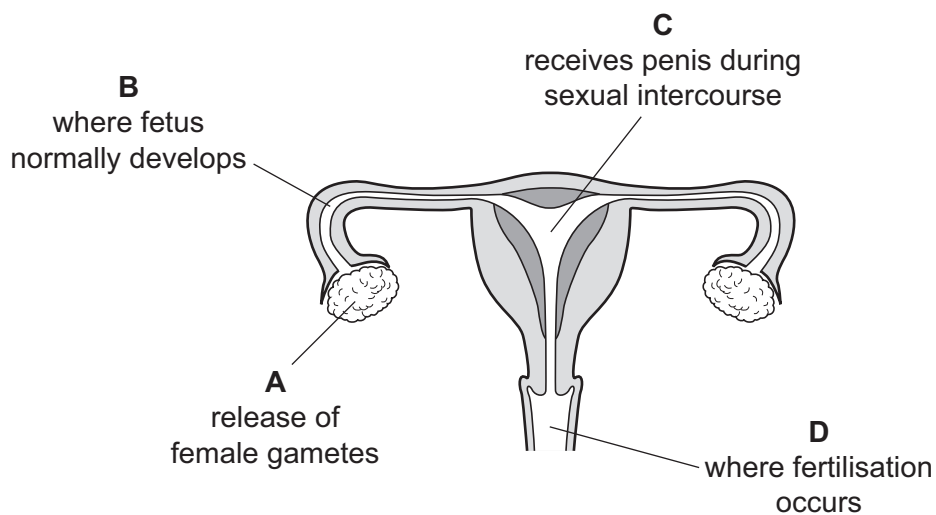
- A** glucose → oxygen + water + carbon dioxide
B glucose + carbon dioxide → oxygen + water
C glucose + oxygen → water + carbon dioxide
D glucose + water → oxygen + carbon dioxide

11 A student investigates the conditions needed for the germination of seeds.

Which seeds germinate first?



12 Which part of the female reproductive system shows the correct function?



13 An example of a food chain is shown.

grass → slug → frog → fox

Which terms describe the slug in this food chain?

- 1 carnivore
- 2 herbivore
- 3 primary consumer
- 4 secondary consumer

A 1 and 3

B 1 and 4

C 2 and 3

D 2 and 4

- 14 Element Y has a proton number of 18 and a nucleon number of 40.

Which statements about an atom of element Y are correct?

- 1 It has 40 neutrons in its nucleus.
- 2 It has 22 electrons.
- 3 It is unreactive.
- 4 It is in Group VIII of the Periodic Table.

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

- 15 Which compound contains covalent bonds?

A LiI **B** HCl **C** KCl **D** NaBr

- 16 The initial and the final temperatures of four different reactions are recorded.

Which reaction is the **most** exothermic?

	initial temperature /°C	final temperature /°C
A	19	16
B	20	19
C	22	24
D	24	25

- 17 Calcium carbonate and dilute hydrochloric acid start to react. Water is then added to the reaction mixture.

What happens to the rate of the reaction when the water is added?

- A** decreases
B increases
C stays the same
D stops

- 18 Which metal in Group I of the Periodic Table has the highest melting point?

- A** lithium
B sodium
C potassium
D rubidium

19 Element Q is in Group VII of the Periodic Table.

The melting point and boiling point of element Q are shown.

melting point/°C	−7.2
boiling point/°C	58.8

What is element Q?

- A** bromine
- B** chlorine
- C** fluorine
- D** iodine

20 Brass is made from copper and zinc.

Which row describes the type of substance and the electrical conductivity of brass?

	type of substance	electrical conductivity
A	mixture	poor
B	mixture	good
C	compound	poor
D	compound	good

21 Which two substances form when magnesium reacts with steam?

- A** magnesium hydroxide and hydrogen
- B** magnesium hydroxide and oxygen
- C** magnesium oxide and hydrogen
- D** magnesium oxide and water

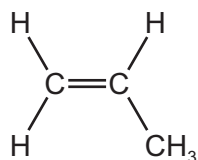
22 Anhydrous copper(II) sulfate is used to test for water.

Which colour does it turn in the presence of water?

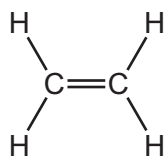
- A** white
- B** pink
- C** green
- D** blue

- 23** Which statement about air is correct?
- A** Air is a mixture of elements and compounds.
 - B** Carbon monoxide in the air is a particulate.
 - C** Clean, dry air consists of 78% oxygen.
 - D** Nitrogen in the air causes iron to rust.
- 24** Which gas forms during the complete combustion of methane?
- A** carbon monoxide
 - B** carbon dioxide
 - C** hydrogen
 - D** oxygen
- 25** What is petroleum?
- A** an alkene
 - B** a mixture of hydrocarbons
 - C** an ionic compound
 - D** the main constituent of natural gas

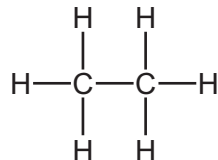
- 26** The structures of molecules W, X, Y and Z are shown.



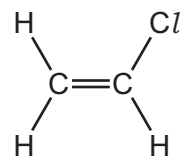
W



X



Y



Z

Which molecules are unsaturated hydrocarbons?

- A** W, X and Y **B** W, X and Z **C** W and X only **D** Y and Z only

- 27** Aqueous ammonia is added to a solution containing a salt.

A white precipitate is produced which dissolves in excess aqueous ammonia.

Which ion is present in the salt?

- A** ammonium
- B** iron(II)
- C** iron(III)
- D** zinc

- 28** An empty measuring cylinder has a mass of 180 g.

A volume of 65 cm^3 of a liquid is added to the measuring cylinder.

The total mass of the cylinder and the liquid is 240 g.

What is the density of the liquid?

- A** 0.92 g/cm^3
- B** 1.1 g/cm^3
- C** 2.8 g/cm^3
- D** 3.7 g/cm^3

- 29** A ball is thrown vertically upwards with a kinetic energy of 60 J.

Ignore air resistance.

Which row describes the energy changes that occur as the ball moves up to its highest point?

	kinetic energy	gravitational potential energy
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B	decreases by 60 J	increases by 120 J
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D	increases by 60 J	decreases by 120 J

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The student exerts pressure P on the ground.

The student now lifts one foot off the ground.

What is the pressure now exerted on the ground?

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The temperature of the substance is changed and this causes the particles to move more quickly.

Which row shows the state of the substance and the change in temperature?

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C	solid	decrease
D	solid	increase

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Which statement describes where convection takes place?

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The outside surfaces of the container are painted.

Which type of paint results in the smallest rate of increase in temperature of the water?

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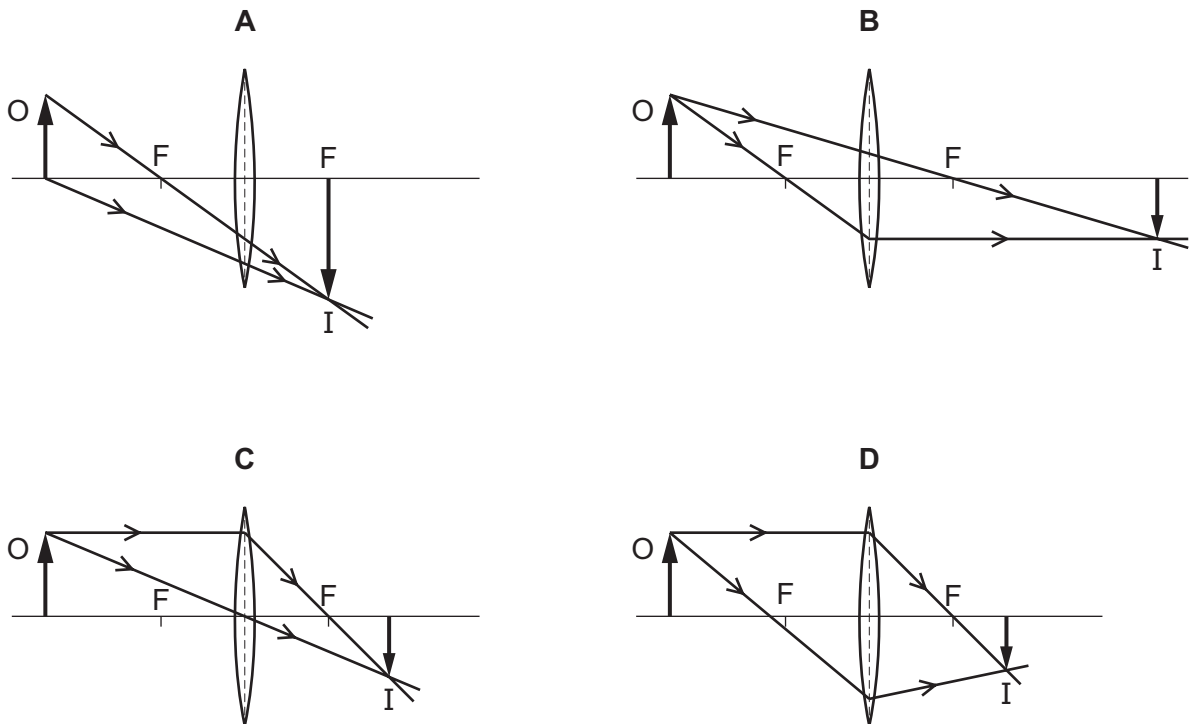
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Object O is placed near the lens. The lens produces image I of the object.

Which diagram shows how image I is formed by the lens?



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Which region has waves with the smallest wavelength?

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The voltage across the resistor is 2.0 V .

What is the resistance of resistor R ?

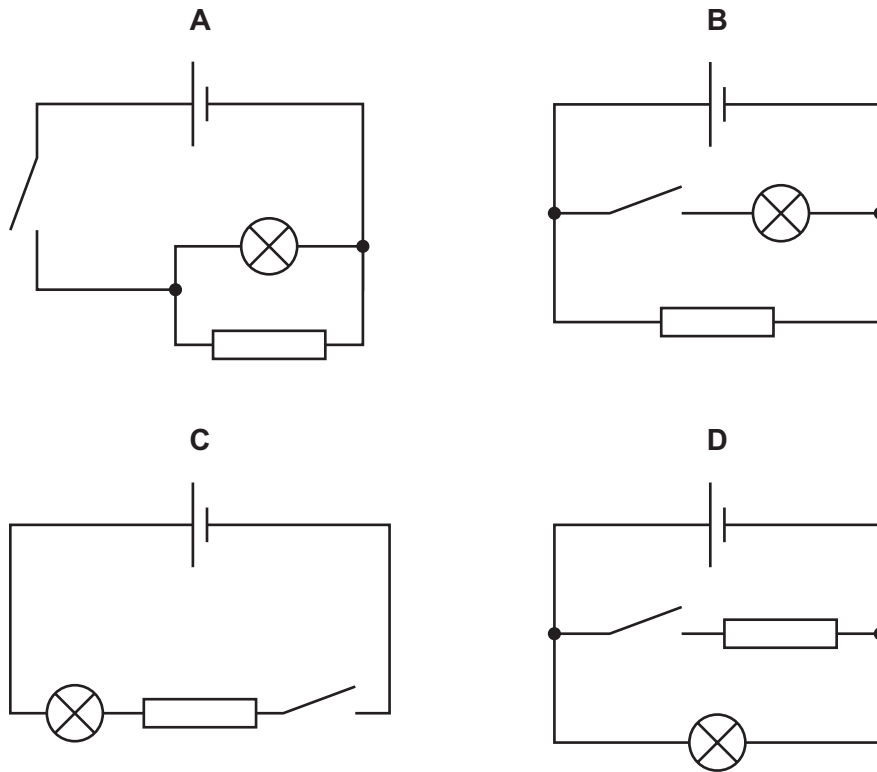
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The Periodic Table of Elements

Group																											
I	II											III	IV	V	VI	VII	VIII										
3 Li lithium 7	4 Be beryllium 9	12 Mg magnesium 24	Key atomic number atomic symbol name relative atomic mass										1 H hydrogen 1							2 He helium 4							
11 Na sodium 23												5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20										
												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 oganesion —

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.).



Cambridge IGCSE™

COMBINED SCIENCE

Paper 1 Multiple Choice (Core)

0653/13

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.



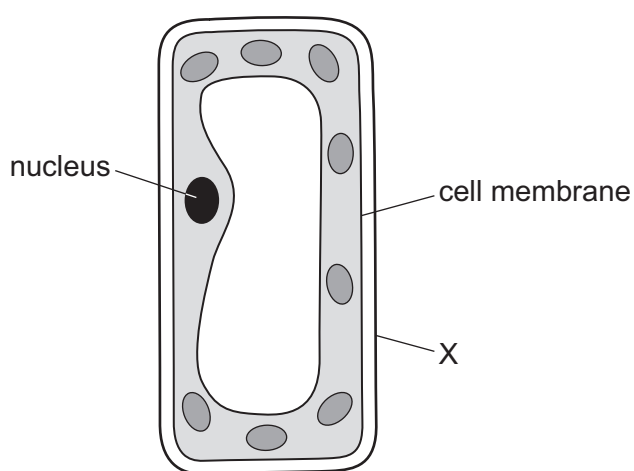
- 1 A student is playing a game of football.

Which characteristics of living organisms does the student show?

- 1 growth
- 2 movement
- 3 respiration
- 4 sensitivity

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

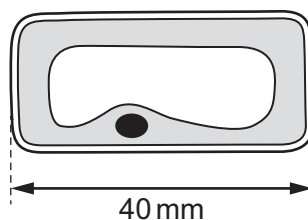
- 2 The diagram shows a plant cell.



Which part of the cell is labelled X?

- A** cell wall
- B** chloroplast
- C** cytoplasm
- D** vacuole

- 3 The diagram shows a scale drawing of a cell.



The actual length of the cell is 0.002 mm.

What is the magnification of the cell?

- A** $\times 20$ **B** $\times 200$ **C** $\times 2000$ **D** $\times 20\,000$

4 Which biological molecule is made from amino acids?

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

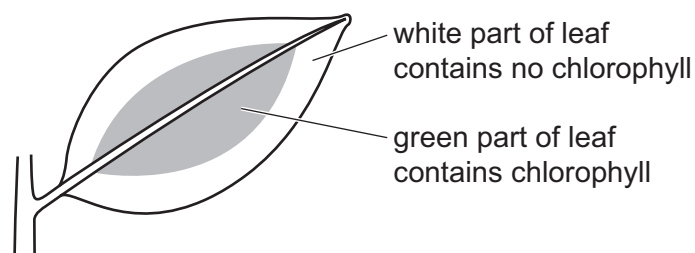
5 The table shows the time taken for an enzyme-controlled reaction to be completed at different temperatures.

temperature / °C	10	20	30	40	50
time taken for reaction to be completed / s	500	360	200	80	240

At which temperature does the enzyme work best?

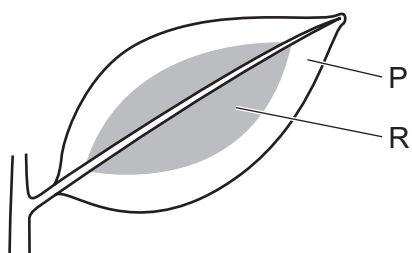
- A 10 °C B 30 °C C 40 °C D 50 °C

- 6 A student investigates the need for chlorophyll in photosynthesis.

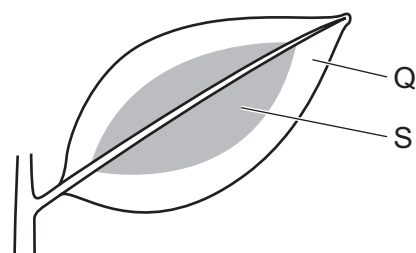


One leaf is placed in the dark and a second leaf is placed in the light for 48 hours.

leaf left in dark



leaf left in light

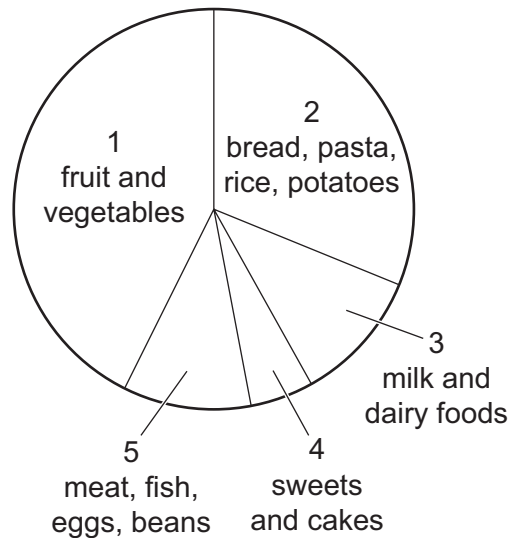


After 48 hours, the student tests the leaves for the presence of starch.

Which row shows the results?

	parts with starch present	parts with no starch present
A	P and Q	R and S
B	P, Q and R	S
C	R and S	P and Q
D	S	P, Q and R

- 7 The diagram shows suggested daily proportions of different dietary food groups.



Which food groups contain the highest amounts of carbohydrate?

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

- 8 In the alimentary canal, chemical digestion breaks down 1..... , ...2..... molecules.

Which words complete gaps 1 and 2?

	1	2
A	large	insoluble
B	large	soluble
C	small	soluble
D	small	insoluble

- 9 What is transpiration?

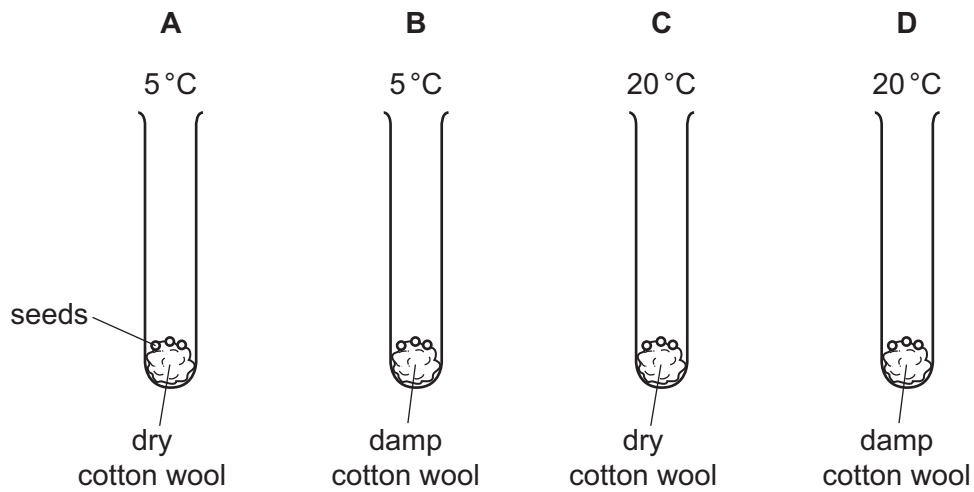
- A** absorption of water by root hair cells
B loss of water vapour from leaves
C loss of water vapour from the roots of plants
D transport of sucrose in the phloem

- 10 What is the word equation for aerobic respiration?

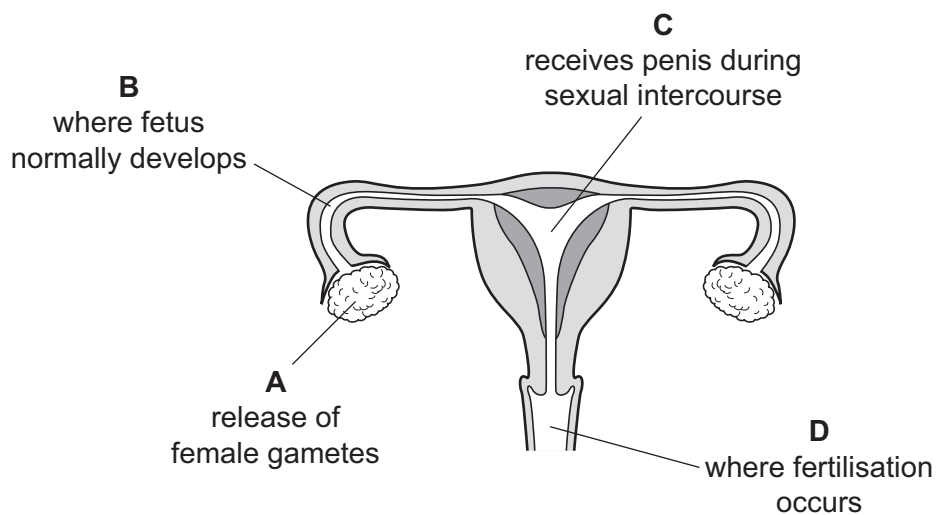
- A** glucose → oxygen + water + carbon dioxide
B glucose + carbon dioxide → oxygen + water
C glucose + oxygen → water + carbon dioxide
D glucose + water → oxygen + carbon dioxide

11 A student investigates the conditions needed for the germination of seeds.

Which seeds germinate first?



12 Which part of the female reproductive system shows the correct function?



13 An example of a food chain is shown.

grass → slug → frog → fox

Which terms describe the slug in this food chain?

- 1 carnivore
- 2 herbivore
- 3 primary consumer
- 4 secondary consumer

A 1 and 3

B 1 and 4

C 2 and 3

D 2 and 4

- 14 Element Y has a proton number of 18 and a nucleon number of 40.

Which statements about an atom of element Y are correct?

- 1 It has 40 neutrons in its nucleus.
- 2 It has 22 electrons.
- 3 It is unreactive.
- 4 It is in Group VIII of the Periodic Table.

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

- 15 Which compound contains covalent bonds?

A LiI **B** HCl **C** KCl **D** NaBr

- 16 The initial and the final temperatures of four different reactions are recorded.

Which reaction is the **most** exothermic?

	initial temperature /°C	final temperature /°C
A	19	16
B	20	19
C	22	24
D	24	25

- 17 Calcium carbonate and dilute hydrochloric acid start to react. Water is then added to the reaction mixture.

What happens to the rate of the reaction when the water is added?

- A** decreases
B increases
C stays the same
D stops

- 18 Which metal in Group I of the Periodic Table has the highest melting point?

- A** lithium
B sodium
C potassium
D rubidium

19 Element Q is in Group VII of the Periodic Table.

The melting point and boiling point of element Q are shown.

melting point/°C	−7.2
boiling point/°C	58.8

What is element Q?

- A** bromine
- B** chlorine
- C** fluorine
- D** iodine

20 Brass is made from copper and zinc.

Which row describes the type of substance and the electrical conductivity of brass?

	type of substance	electrical conductivity
A	mixture	poor
B	mixture	good
C	compound	poor
D	compound	good

21 Which two substances form when magnesium reacts with steam?

- A** magnesium hydroxide and hydrogen
- B** magnesium hydroxide and oxygen
- C** magnesium oxide and hydrogen
- D** magnesium oxide and water

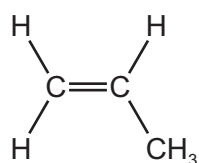
22 Anhydrous copper(II) sulfate is used to test for water.

Which colour does it turn in the presence of water?

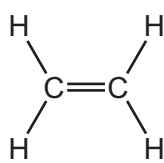
- A** white
- B** pink
- C** green
- D** blue

- 23** Which statement about air is correct?
- A** Air is a mixture of elements and compounds.
 - B** Carbon monoxide in the air is a particulate.
 - C** Clean, dry air consists of 78% oxygen.
 - D** Nitrogen in the air causes iron to rust.
- 24** Which gas forms during the complete combustion of methane?
- A** carbon monoxide
 - B** carbon dioxide
 - C** hydrogen
 - D** oxygen
- 25** What is petroleum?
- A** an alkene
 - B** a mixture of hydrocarbons
 - C** an ionic compound
 - D** the main constituent of natural gas

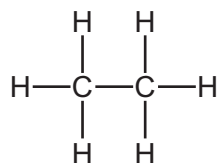
- 26** The structures of molecules W, X, Y and Z are shown.



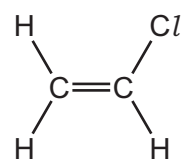
W



X



Y



Z

Which molecules are unsaturated hydrocarbons?

- A** W, X and Y **B** W, X and Z **C** W and X only **D** Y and Z only

- 27** Aqueous ammonia is added to a solution containing a salt.

A white precipitate is produced which dissolves in excess aqueous ammonia.

Which ion is present in the salt?

- A** ammonium
- B** iron(II)
- C** iron(III)
- D** zinc

- 28** An empty measuring cylinder has a mass of 180 g.

A volume of 65 cm^3 of a liquid is added to the measuring cylinder.

The total mass of the cylinder and the liquid is 240 g.

What is the density of the liquid?

- A** 0.92 g/cm^3
- B** 1.1 g/cm^3
- C** 2.8 g/cm^3
- D** 3.7 g/cm^3

- 29** A ball is thrown vertically upwards with a kinetic energy of 60 J.

Ignore air resistance.

Which row describes the energy changes that occur as the ball moves up to its highest point?

	kinetic energy	gravitational potential energy
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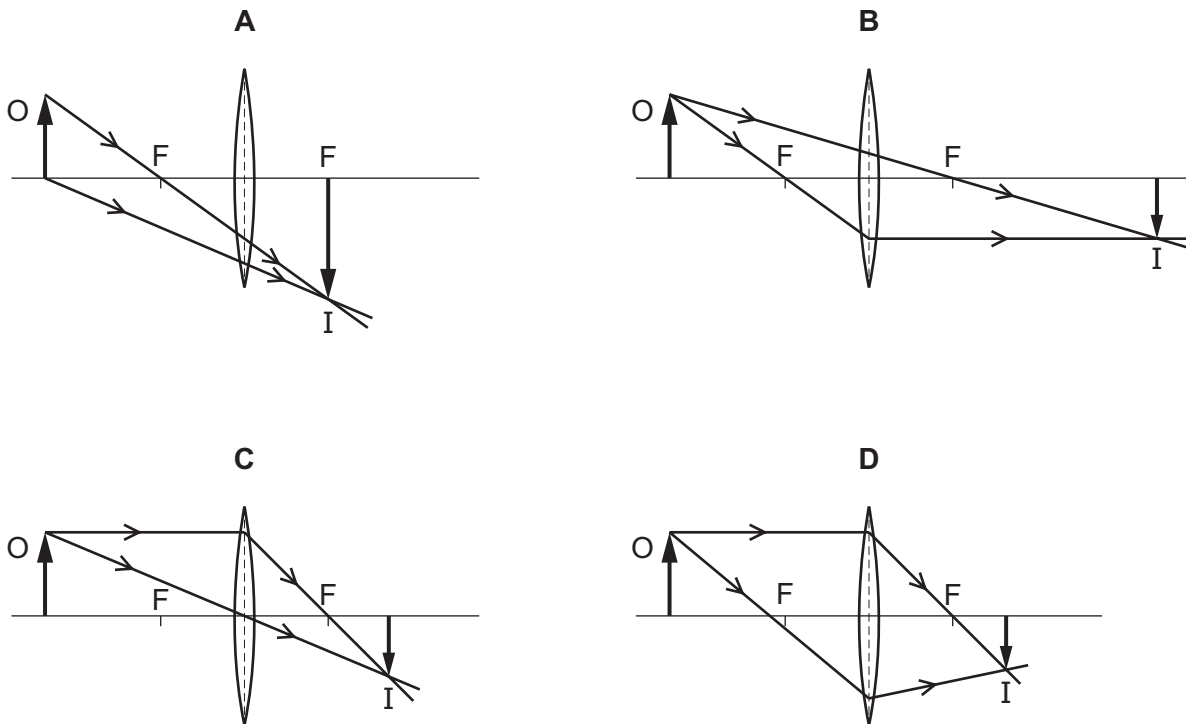
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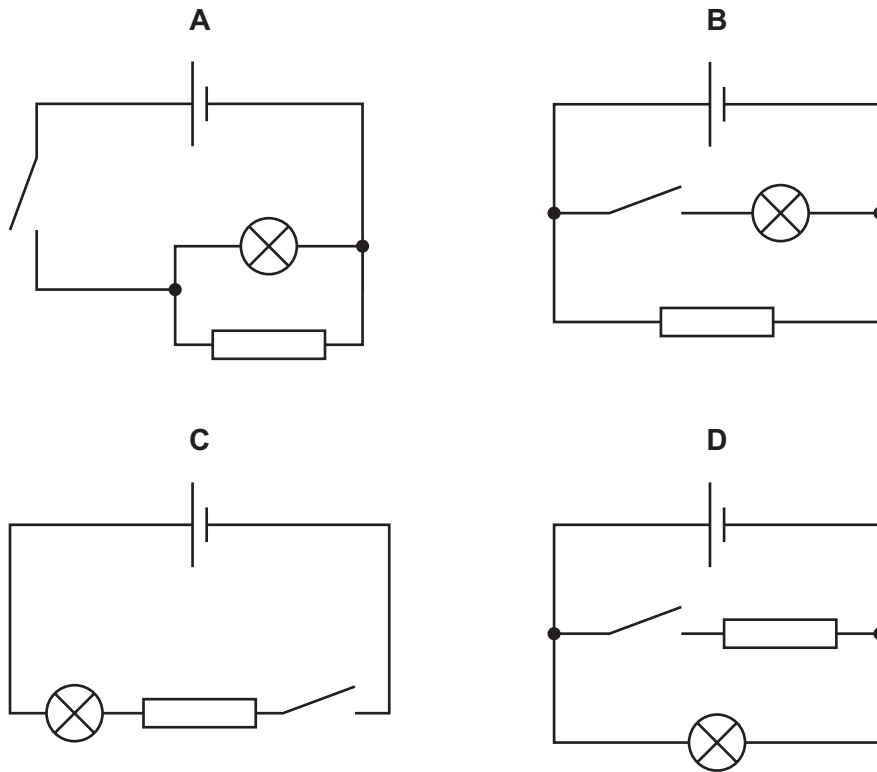
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lanthanoids

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 —

actinoids

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