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CAMBRIDGE
International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/21**

Paper 2 Multiple Choice (Extended) **May/June 2026**

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 or tape.
- 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.

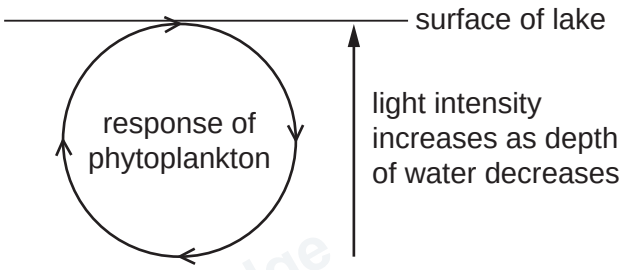
This document has **16** pages. Any blank pages are indicated.

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[Turn over

1 Phytoplankton are microorganisms that photosynthesise. Some phytoplankton live in lakes.

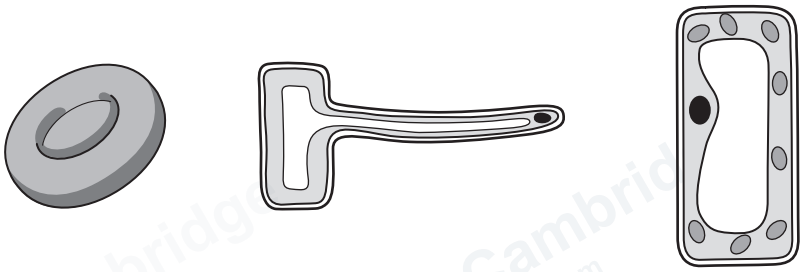
The diagram shows the response of some types of phytoplankton to changes in light intensity.



Which characteristics of living things are shown by the phytoplankton in the diagram?

	growth	**movement**	**sensitivity**
A	no	yes	yes
B	no	no	yes
C	yes	no	yes
D	yes	yes	no

2 The diagrams show three types of cell that are specialised to carry out particular functions.



1 2 3

Which row gives the correct function for each cell type?

	cell 1	**cell 2**	**cell 3**
A	absorption	absorption	photosynthesis
B	transport	transport	absorption
C	transport	absorption	photosynthesis
D	absorption	photosynthesis	transport

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3 Which equation is used to calculate the magnification of an organism from image size and actual size?

A $\text{magnification} = \frac{\text{image size}}{\text{actual size}}$

B $\text{magnification} = \frac{\text{actual size}}{\text{image size}}$

C magnification = image size × actual size

D magnification = actual size + image size

4 The diagram shows a leaf that was tested for starch using iodine solution.



Which row shows the results for this leaf and explains the results?

	green area of leaf after test	white area of leaf after test	explanation
A	blue-black	blue-black	chlorophyll is found in all parts of the leaf
B	blue-black	brown	chlorophyll is found in only part of the leaf
C	brown	brown	chlorophyll is found in all parts of the leaf
D	brown	blue-black	chlorophyll is found in only part of the leaf

5 Which enzymes are needed to digest proteins and oils?

	amylase	lipase	protease
A	no	yes	yes
B	yes	no	yes
C	yes	yes	no
D	yes	yes	yes

6 Which description of transpiration is correct?

A the absorption of water vapour by leaves

B the loss of water vapour from leaves

C the loss of water from roots

D the uptake of water by roots

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7 What is a role of blood clotting?

A It decreases blood pressure.

B It increases the flow of blood to the cut.

C It prevents coronary heart disease.

D It prevents the entry of pathogens.

8 What happens as part of the process of active immunity?

1 Antibodies are given to the body.

2 Antibodies are produced in the body.

3 Antibodies decrease in number.

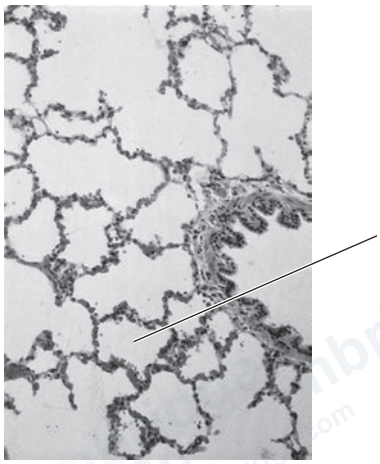
4 Antibodies increase in number.

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

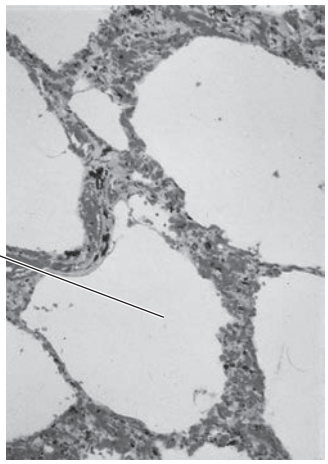
9 The photomicrographs show alveoli from a lung of a healthy person and from a lung of a person with lung disease.

The photomicrographs are at the **same** magnification.

lung of a healthy person



lung of a person with lung disease



People with lung disease find it more difficult to gain enough oxygen because gas exchange is slower.

Which features shown in the photomicrographs cause the person with lung disease to have slower gas exchange?

1 The alveoli of the person with lung disease have a greater surface area.

2 The alveoli of the person with lung disease have a thicker wall.

3 The lungs of the person with lung disease have fewer alveoli.

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

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10 What is the maximum number of carbon dioxide molecules produced when four glucose molecules are used in aerobic respiration?

A 6 **B** 12 **C** 24 **D** 48

11 Which statements explain why antibiotics should **not** be used to treat all infections?

1 Antibiotics only destroy the protein coat of viruses.

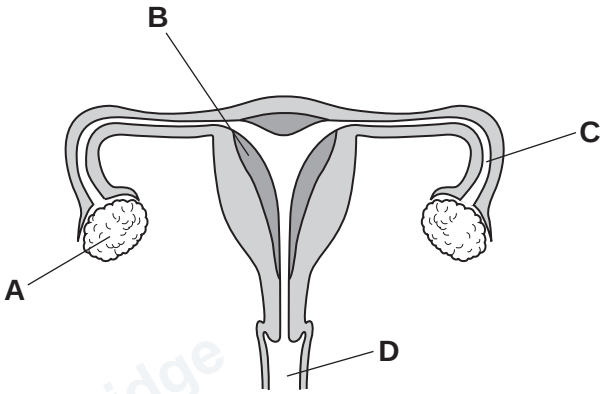
2 Overuse of antibiotics may lead to antibiotic resistance.

3 Increasing use of antibiotics increases the chance of bacteria developing immunity to antibiotics.

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

12 The diagram shows a section through the human female reproductive system.

Which letter shows where a fertilised egg is implanted?



13 What are undesirable effects of deforestation?

1 increase of carbon dioxide in the air

2 extinction of species

3 loss of soil

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

14 Which statement describes the particles in a gas?

A They have a regular arrangement.

B They are closely packed.

C They occupy all the available space.

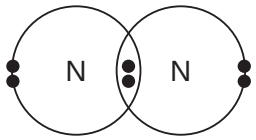
D They vibrate about a fixed point.

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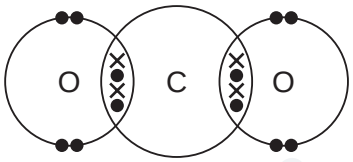
15 Which row describes a chemical change?

	process	energy change occurs	new substances formed
A	combustion	no	no
B	evaporation	no	yes
C	combustion	yes	yes
D	evaporation	yes	no

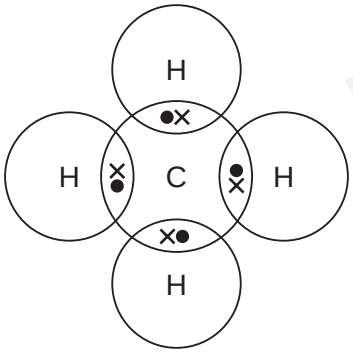
16 Which dot-and-cross diagrams show the correct number of outer-shell electrons in the molecules?



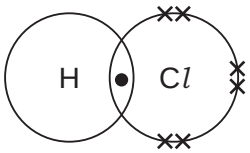
1



2



3



4

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

17 Which statement about bonding is correct?

A Ionic bonds are weak.

B Covalent bonds are weak.

C Ionic compounds usually have lower boiling points than covalent compounds.

D Ionic compounds contain stronger attractive forces than covalent compounds.

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18 The equation represents the formation of chlorine atoms from a chlorine molecule.

$$Cl_2 \rightarrow 2Cl$$

Which statement describes the energy change in this reaction?

A Thermal energy is taken in from the surroundings so the reaction is endothermic.

B Thermal energy is transferred to the surroundings so the reaction is endothermic.

C Thermal energy is taken in from the surroundings so the reaction is exothermic.

D Thermal energy is transferred to the surroundings so the reaction is exothermic.

19 Four separate samples of magnesium react with dilute hydrochloric acid. In each reaction, the concentration of the hydrochloric acid is the same.

Which experiment gives the greatest rate of reaction?

A 2 g of magnesium powder in 25 cm^3 of dilute hydrochloric acid at 50 °C

B 2 g of magnesium powder in 50 cm^3 of dilute hydrochloric acid at 25 °C

C 2 g of magnesium ribbon in 25 cm^3 of dilute hydrochloric acid at 25 °C

D 2 g of magnesium ribbon in 50 cm^3 of dilute hydrochloric acid at 50 °C

20 Which statement about the preparation of an insoluble salt by precipitation is correct?

A Dilute acid is added to an insoluble solid.

B A precipitate forms and the remaining solution is removed by evaporation.

C The reactants are both soluble substances.

D The insoluble reactant is in excess.

21 Ethanol is a fuel used in cars. It can be made from petroleum.

$$C_4H_{10} \rightarrow C_2H_4 + C_2H_6 \quad \text{cracking}$$

$$C_2H_4 + H_2O \rightarrow C_2H_5OH \quad \text{producing ethanol}$$

$$C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O \quad \text{burning}$$

How many homologous series are present in the compounds in these equations?

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

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22 Which process is used to extract aluminium?

A electrolysis

B heat with carbon

C heat with hydrogen

D reduction by carbon monoxide

23 Which of these contributes to global warming?

A greenhouse gases emitting thermal energy into space

B greenhouse gases reacting with oxygen in an exothermic process

C methane and carbon dioxide molecules absorbing light energy

D methane and carbon dioxide molecules absorbing thermal energy

24 In the blast furnace, carbon reacts with carbon dioxide to form carbon monoxide.

$$C + CO_2 \rightarrow 2CO$$

Which statement describes why carbon monoxide is essential in the extraction of iron from hematite?

A Carbon monoxide is needed to reduce iron oxide.

B Carbon monoxide is needed to neutralise impurities.

C Carbon monoxide removes carbon impurities from the hematite.

D The production of carbon monoxide prevents the release of greenhouse gases.

25 Which substance turns aqueous bromine colourless?

A an alkane

B an alkene

C a saturated hydrocarbon

D poly(ethene)

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26 Petroleum is separated into fractions by fractional distillation.

Refinery gas is produced high up in the fractionating column.

Bitumen is produced at the bottom of the fractionating column.

The boiling temperature ranges of other fractions are shown.

fraction	boiling temperature range / °C
gasoline	30–115
naphtha	90–220
diesel oil	260–340

Tricosane is a hydrocarbon with a boiling point of 380 °C.

In which fraction is tricosane found?

A refinery gas

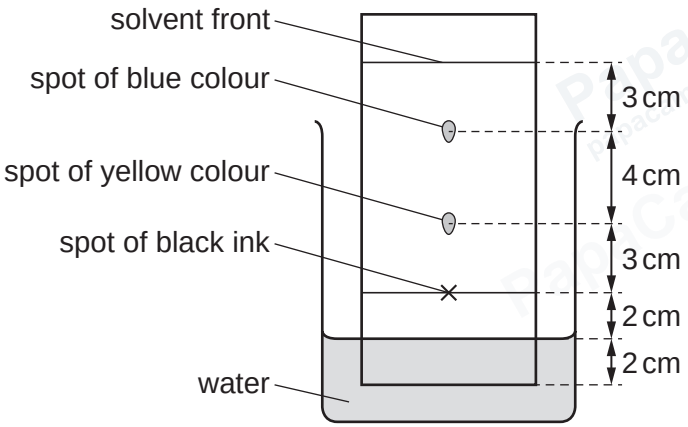
B gasoline

C naphtha

D bitumen

27 A paper chromatography experiment is set up.

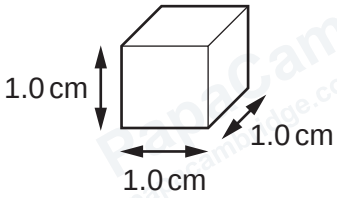
The experiment after 15 minutes is shown.



What is the ratio of the R_f values of the two colours R_f blue : R_f yellow?

A 4 : 3 **B** 7 : 3 **C** 9 : 5 **D** 11 : 7

28 Solid aluminium cube X has sides of length 1.0 cm.



Solid aluminium cube Y has sides of length 2.0 cm.

Which statement about the cubes is correct?

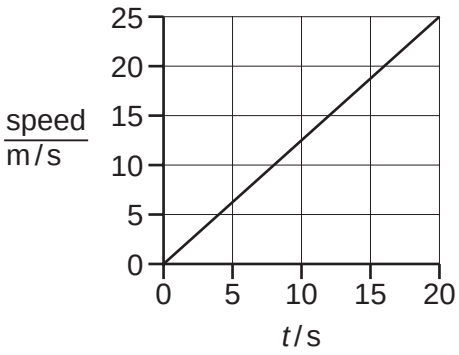
A They have the same density.

B They have the same mass.

C Y has double the density of X.

D Y has double the mass of X.

29 The graph shows the relationship between the speed of a car and the time for the first 20 s after it starts to move.



Which row gives the acceleration of the car and the distance travelled in these 20 s?

	acceleration / m/s²	distance / m
A	0.80	250
B	0.80	500
C	1.25	250
D	1.25	500

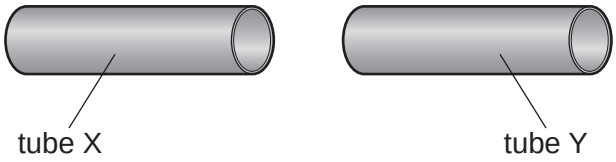
30 A car travels at a speed of 13.0 m/s. The kinetic energy of the car is 190 kJ.

What is the mass of the car?

A 562 kg **B** 850 kg **C** 1780 kg **D** 2250 kg

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31 The diagram shows two thin steel tubes, X and Y. The tubes have identical dimensions at room temperature.



How can tube X be made to fit inside tube Y?

A Cool both tubes to the same low temperature.

B Only cool tube X to a low temperature.

C Heat both tubes to the same high temperature.

D Only heat tube X to a high temperature.

32 Hot drinks are served in cups with a plastic lid.

What is the effect of the lid on the transfer of thermal energy?

A It mainly reduces conduction.

B It mainly reduces convection.

C It mainly reduces radiation.

D It reduces conduction, convection and radiation equally.

33 Which statement explains why metals are good electrical conductors?

A Metals contain ions that are free to move through the material.

B Metals contain ions that are held together by strong bonds.

C Metals contain electrons that are free to move through the material.

D Metals contain electrons that are held together by strong bonds.

34 The speed of sound in air is approximately 330 m / s.

The speed of sound in water is approximately 1500 m / s.

What is a possible speed of sound in solid iron?

A 120 m / s **B** 330 m / s **C** 1200 m / s **D** 5100 m / s

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35 When a transverse seismic wave passes through the Earth, particles in the Earth vibrate.

Which row shows the direction of vibration and the type of seismic wave?

	direction of vibration	type of seismic wave
A	at right-angles to direction of propagation	P-wave
B	at right-angles to direction of propagation	S-wave
C	parallel to direction of propagation	P-wave
D	parallel to direction of propagation	S-wave

36 An object is placed in front of a vertical plane mirror.

Which description of the image is correct?

A real and larger than the object

B real and same size as the object

C virtual and larger than the object

D virtual and same size as the object

37 There is a current of 4.0 A in a resistor.

How much charge passes through the resistor in 8.0 s?

A 0.50 C **B** 2.0 C **C** 12 C **D** 32 C

38 A student has two resistors each of resistance R. He connects the two resistors into a circuit, first in series and then in parallel.

What is the combined resistance of the two resistors in series and parallel?

	in series	in parallel
A	greater than R	greater than R
B	greater than R	less than R
C	less than R	greater than R
D	less than R	less than R

39 There is a current I in a resistor of resistance R. The voltage across the resistor is V.

Which equation gives the power P transferred in the resistor?

A $P = IR$ **B** $P = IV$ **C** $P = \frac{V}{I}$ **D** $P = \frac{R}{V}$

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40 Which reaction takes place inside stable stars?

A fission of helium to give hydrogen

B fission of hydrogen to give helium

C fusion of helium to give hydrogen

D fusion of hydrogen to give helium

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The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89–103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –	113 Nh nihonium –	114 Fl flerovium –	115 Mc moscovium –	116 Lv livermorium –	117 Ts tennessine –	118 Og oganesson –

Key

atomic number
atomic symbol
name
relative atomic mass

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

0653/21 Question Paper June 2026

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