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CAMBRIDGE
International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/22**

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).

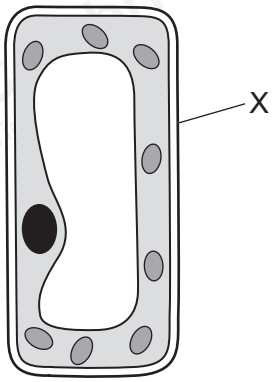
INFORMATION

- 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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1 The diagram shows a plant cell as seen under a light microscope.



What is the function of the part labelled X?

A photosynthesis

B site of chemical reactions

C stores DNA

D supports the cell

2 The table shows some information about active transport.

Which row describes features of active transport?

	moves particles from a lower concentration to a higher concentration	**transports molecules only**	**requires energy**
A	no	no	no
B	no	yes	yes
C	yes	no	no
D	yes	no	yes

3 The rate of an enzyme-controlled reaction decreases when the temperature decreases below the optimum.

Which statement explains why the rate of reaction decreases?

A The effective collisions between enzyme and substrate molecules occur less often.

B The enzyme and substrate molecules have more kinetic energy.

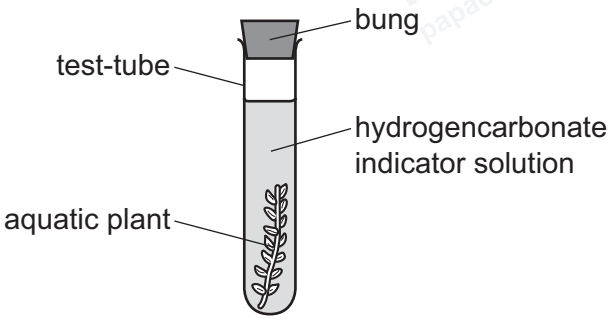
C The enzyme's active site is denatured.

D There is an increase in the concentration of products.

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4 A student places identical aquatic plants in two test-tubes containing hydrogencarbonate indicator solution.

The diagram shows the apparatus used.



One plant is placed in the dark for 24 hours and the other is placed in the light for 24 hours.

The hydrogencarbonate indicator solution of the plant placed in the dark turned yellow and the hydrogencarbonate indicator solution of the plant placed in the light turned purple.

Which row explains the results?

	plant placed in the dark	plant placed in the light
A	the plant only respires	the plant only photosynthesises
B	the plant only respires	the plant photosynthesises more than it respires
C	the plant respires more than it photosynthesises	the plant only photosynthesises
D	the plant respires more than it photosynthesises	the plant photosynthesises more than it respires

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5 The table shows information about the nutritional content of red lentils, leeks and chicken.

		mass of nutrient in g in 100 g of each food		
nutrient	**recommended daily mass / g**	**red lentils**	**leeks**	**chicken**
carbohydrates	310	59.0	14.0	0.0
fats and oils	94	2.2	0.3	14.0
fibre	30	10.8	1.8	0.0
protein	50	25.0	1.5	27.0

A person eats 100 g each of red lentils, leeks and chicken in one day. This is the only food they eat during the day.

Which statement is supported by the data?

A The person has consumed more fats and oils than the recommended daily mass.

B Only 10% of the recommended daily mass of fibre has been consumed.

C The person has consumed less than 25% of the recommended daily mass of carbohydrates.

D The person needs more protein in their diet to meet the recommended daily mass for protein.

6 What describes the molecules that are absorbed in the alimentary canal?

A large and insoluble

B large and soluble

C small and insoluble

D small and soluble

7 Which row shows changes that decrease the rate of transpiration by the greatest amount?

	temperature	**wind speed**
A	decrease	decrease
B	decrease	increase
C	increase	increase
D	increase	decrease

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8 How does blood clotting help to reduce the risk of infection?

A It prevents the loss of blood.

B It prevents the entry of pathogens.

C It produces white blood cells.

D It produces platelets.

9 Which type of immunity produces antibodies as a defence against a pathogen?

A active

B direct

C genetic

D random

10 What is the balanced symbol equation for aerobic respiration?

A $C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$

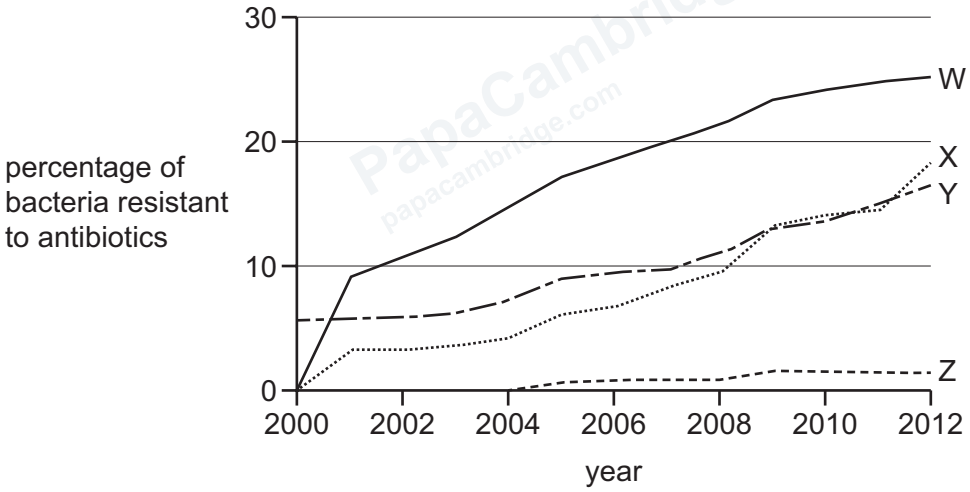
B $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

C $CO_2 + H_2O \rightarrow C_6H_{12}O_6 + O_2$

D $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

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11 The graph shows how the percentage of bacteria resistant to four antibiotics, W, X, Y and Z, changes between 2000 and 2012.



What can be deduced from the graph?

A Bacteria had no resistance to any of the antibiotics in 2000.

B The percentage of bacteria resistant to all the antibiotics increased between 2005 and 2012.

C In 2010, 28% of bacteria were resistant to antibiotic W.

D The steepest increase in resistance to any antibiotic was antibiotic X between 2008 and 2009.

12 Which part of an insect-pollinated flower is linked to its function?

A Anthers produce pollen.

B Petals are sticky to collect pollen grains.

C Sepals produce ovules.

D Stigma protect the unopened flower.

13 Which term is defined as a unit containing a community of organisms and their environment, interacting together?

A carbon cycle

B ecosystem

C food chain

D food web

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14 Oxygen gas is dissolved in pure water to form a solution.

What is the solution?

A a compound

B a mixture of an element and a compound

C a mixture of compounds

D a mixture of elements

15 An atom of element X contains 3 electrons and 4 neutrons.

Which row identifies the group number of X in the Periodic Table and the charge on an ion of X?

	group number	charge on ion
A	I	negative
B	I	positive
C	VII	negative
D	VII	positive

16 Which process occurs during electrolysis?

A Anions gain electrons at the anode.

B Anions lose electrons at the anode.

C Cations gain electrons at the anode.

D Cations lose electrons at the cathode.

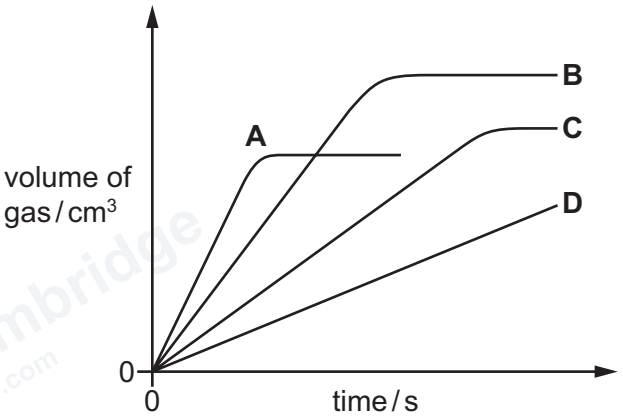
17 Which row describes an endothermic reaction?

	energy of reactants	temperature of surroundings
A	less than products	decreases
B	less than products	increases
C	more than products	decreases
D	more than products	increases

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18 Which line on the graph represents the reaction with the greatest rate?



19 Which row explains why increasing the temperature and increasing the concentration both increase the rate of a reaction?

	increasing temperature	increasing concentration
A	activation energy of the reaction is lowered	more particles have the activation energy
B	more particles have the activation energy	activation energy of the reaction is lowered
C	more particles have the activation energy	frequency of collisions increases
D	frequency of collisions increases	more particles have the activation energy

20 Which method is the first step in the preparation of a pure sample of the named salt?

A Insoluble calcium sulfate is prepared by reacting excess insoluble calcium hydroxide with dilute sulfuric acid.

B Insoluble lead(II) chloride is prepared by reacting excess aqueous lead(II) nitrate with dilute hydrochloric acid.

C Soluble magnesium chloride is prepared by reacting excess dilute hydrochloric acid with insoluble magnesium carbonate.

D Soluble sodium sulfate is prepared by reacting excess aqueous sodium hydroxide with dilute sulfuric acid.

21 The equation for a reaction is shown.

$$Cl_2 + 2Br^- \rightarrow 2Cl^- + Br_2$$

Which statement about this reaction is correct?

A Bromine displaces chlorine because chlorine is less reactive than bromine.

B Bromine displaces chlorine because bromine is less reactive than chlorine.

C Chlorine displaces bromine because chlorine is more reactive than bromine.

D Chlorine displaces bromine because bromine is more reactive than chlorine.

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22 Element X and element Y are in the same period of the Periodic Table.

The atomic number and the nucleon number of element Y are the same.

Which statement about element X is correct?

A Element X has an incomplete outer shell of electrons.

B Element X reacts vigorously with oxygen.

C Element X is a monatomic gas at room temperature.

D Element X is a solid that forms coloured compounds.

23 Which method is used to extract aluminium from bauxite?

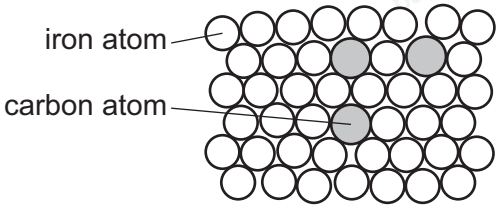
A electrolysis

B heat in air

C heat with carbon monoxide

D reduction using hot carbon

24 The diagram shows the arrangement of atoms in a type of steel.



Which statements about this type of steel are correct?

1 It is a compound.

2 It is an alloy.

3 It contains only metal atoms.

4 Its properties are **not** exactly the same as the properties of pure iron.

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

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25 Petroleum is a .....1..... made up of different hydrocarbons.

Petroleum is separated into useful products by .....2..... because different hydrocarbons have different .....3..... .

Which words complete gaps 1, 2 and 3?

	1	2	3
A	compound	filtration	boiling points
B	compound	fractional distillation	densities
C	mixture	filtration	densities
D	mixture	fractional distillation	boiling points

26 Which statement about alkanes is correct?

A They combust in oxygen.

B They contain a carbon–carbon double bond.

C They contain an oxygen atom.

D They decolourise aqueous bromine.

27 The R_f value can be determined from a chromatogram.

What is the equation for R_f?

A R_f = distance travelled by solvent

B R_f = distance travelled by substance

C $R_f = \frac{\text{distance travelled by solvent}}{\text{distance travelled by substance}}$

D $R_f = \frac{\text{distance travelled by substance}}{\text{distance travelled by solvent}}$

28 A raindrop falls vertically at a constant speed.

What is the resultant force on the raindrop as it falls?

A It is equal to the air pressure on the drop.

B It is equal to the air resistance on the drop.

C It is equal to the weight of the drop.

D It is zero.

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29 An object with a mass of 10 kg is moving at a speed of 5.0 m / s.

What is its kinetic energy?

A 25 J **B** 50 J **C** 125 J **D** 250 J

30 What does efficiency of energy transfer mean?

A the energy output when energy is transferred as useful energy

B the energy input when energy is transferred as useful energy

C the percentage of the energy input that is transferred as useful energy output

D the rate at which energy is transferred as useful energy output

31 The gravitational field strength at the Earth's surface is 9.8 N / kg.

What is the weight of an object of mass 100 g at the Earth's surface?

A 0.98 N **B** 9.8 N **C** 98 N **D** 980 N

32 A sealed bottle contains air.

The bottle and its contents are cooled.

Which statement is correct?

A The air pressure in the bottle decreases because the air particles move faster.

B The air pressure in the bottle decreases because the air particles move slower.

C The air pressure in the bottle stays the same because the air particles move at a steady speed.

D The air pressure in the bottle stays the same because the air particles move randomly.

33 A container of milk is wrapped in a wet cloth. Air blows over the cloth. The temperature of the milk changes as the water in the cloth evaporates.

Which statement is correct?

A The temperature of the milk decreases because the less energetic water molecules escape from the cloth.

B The temperature of the milk decreases because the more energetic water molecules escape from the cloth.

C The temperature of the milk increases because the less energetic water molecules escape from the cloth.

D The temperature of the milk increases because the more energetic water molecules escape from the cloth.

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34 A cooling device in a tank of water cools all the water.

What is the best position for the device, and what is the main method of thermal energy transfer in the water?

	position to fit cooling device	main method of thermal energy transfer
A	at the bottom	conduction
B	at the bottom	convection
C	at the top	conduction
D	at the top	convection

35 Which row gives an example of a transverse wave and a longitudinal wave?

	transverse	longitudinal
A	light wave	radio wave
B	radio wave	sound wave
C	sound wave	light wave
D	sound wave	radio wave

36 The normal human ear has a range of sound frequencies that are audible.

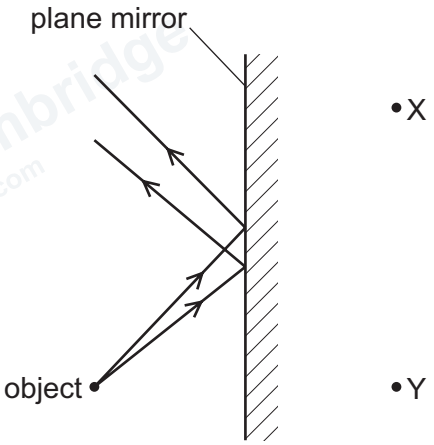
What is the lowest frequency of this range?

A 20 Hz **B** 200 Hz **C** 2000 Hz **D** 20 000 Hz

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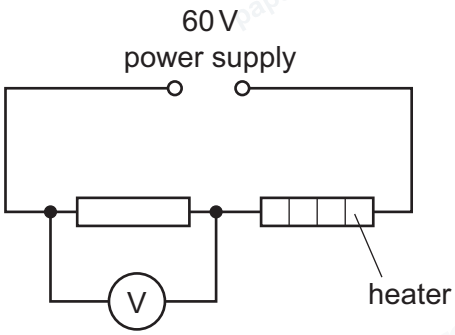
37 The diagram shows rays of light from an object being reflected by a plane mirror.



At which labelled point is the image formed and is the image real or virtual?

	image formed	real or virtual
A	at X	real
B	at X	virtual
C	at Y	real
D	at Y	virtual

38 The diagram shows a 60 V power supply connected to a resistor, a voltmeter and a heater.



The voltage across the heater is 40 V.

What is the reading on the voltmeter?

A 20 V **B** 40 V **C** 60 V **D** 100 V

39 Which two quantities have the same unit?

A current and potential difference (p.d.)

B current and resistance

C electromotive force (e.m.f.) and potential difference (p.d.)

D electromotive force (e.m.f.) and resistance

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40 Which statement about the Big Bang Theory is **not** correct?

A The Universe expanded from a single point of high temperature.

B The Universe expanded from a single point of high density.

C The Universe is approximately 13.8 million years old.

D The Universe is still expanding.

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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.).

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