



Cambridge IGCSE™

COMBINED SCIENCE

0653/12

Paper 1 Multiple Choice (Core)

May/June 2023

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.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

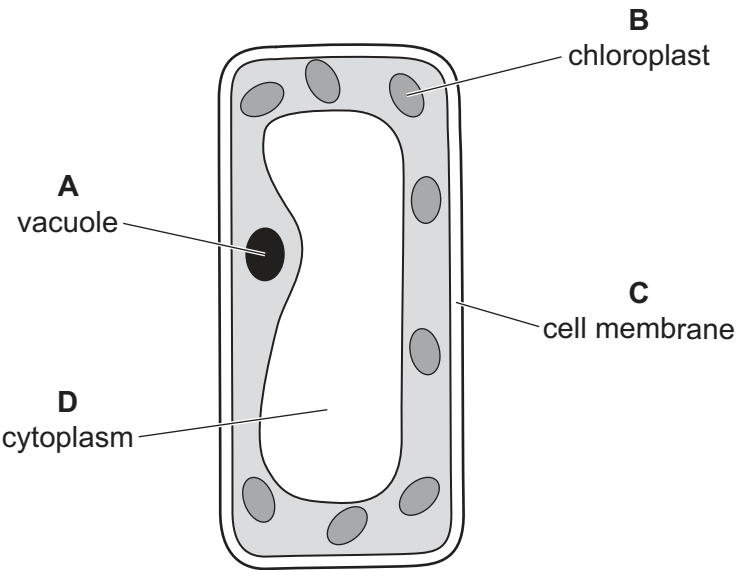
This document has **16** pages. Any blank pages are indicated.



2

- 1 Which process removes toxic materials from an organism?
- A** digestion
- B** egestion
- C** excretion
- D** respiration
- 2 The diagram shows a cell as seen with a microscope.

Which label is correct?



- 3 The table shows the results of tests carried out on a food.

name of test	colour obtained
iodine	brown
Benedict's	orange
biuret	blue

Which nutrients does the food contain?

	reducing sugar	starch	protein
A	✓	✓	x
B	✓	x	x
C	x	✓	✓
D	x	x	✓

3

- 4** The table shows the time taken for an enzyme-controlled reaction to be completed at different pH values.

pH	6	7	8	9
time taken for reaction to be completed / s	170	150	120	100

At which pH value does the enzyme work best?

- A** pH6 **B** pH7 **C** pH8 **D** pH9
- 5** In which order does food pass through parts of the alimentary canal?
- A** oesophagus → anus → large intestine
B small intestine → oesophagus → stomach
C small intestine → large intestine → anus
D stomach → large intestine → small intestine
- 6** A sample of blood is taken from a person who often gets infections.

The blood is also slow to clot.

Which blood components are likely to be at a lower level than normal?

- 1 platelets
2 red blood cells
3 white blood cells

- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only
- 7** From which lung structure does oxygen pass into the blood?
- A** alveoli
B bronchi
C bronchioles
D trachea

4

8 Which word is missing from the word equation for respiration?

..... + oxygen → carbon dioxide + water

- A glucose
- B glycogen
- C protein
- D starch

9 Which physical changes occur in response to a fear stimulus?

	adrenaline concentration in the blood	pulse rate	size of pupil
A	decreases	increases	narrower
B	decreases	decreases	wider
C	increases	increases	wider
D	increases	decreases	narrower

10 Which word describes the growth of a plant towards light?

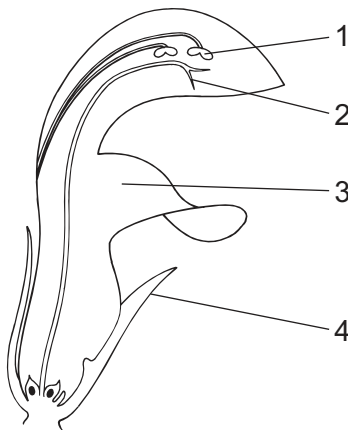
- A gravitropism
- B movement
- C photosynthesis
- D phototropism

11 Which row describes asexual reproduction?

	number of parents involved	offspring genetically identical to each other
A	1	yes
B	1	no
C	2	yes
D	2	no

5

12 The diagram shows a section through an insect-pollinated flower.



Which labels are correct?

	anther	petal	sepal	stigma
A	1	3	4	2
B	1	4	3	2
C	2	3	4	1
D	2	4	3	1

13 What is the journey of a sperm cell during sexual intercourse?

- A** testis → urethra → uterus → oviduct
- B** testis → urethra → oviduct → uterus
- C** urethra → sperm duct → uterus → vagina
- D** urethra → vagina → oviduct → uterus

14 The formulae of three substances are shown.

substance	formula
methane	CH ₄
water	H ₂ O
oxygen	O ₂

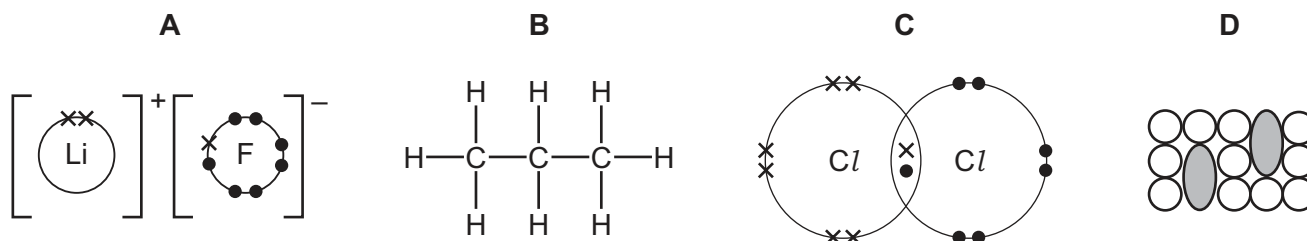
Which statement is correct?

- A** Methane is made from five different types of atom.
- B** Methane, water and oxygen are molecules.
- C** Only methane and water are molecules.
- D** Oxygen is made from two different types of atom.

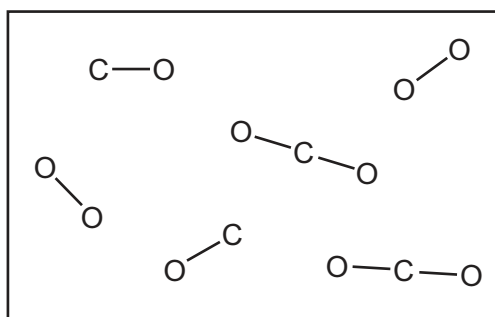
15 What is the definition of nucleon number?

- A the number of protons in an atom
- B the number of electrons in an atom
- C the total number of electrons and neutrons in an atom
- D the total number of neutrons and protons in an atom

16 Which structure represents an ionic compound?



17 A mixture of six gas molecules is shown.



Which statement about the mixture is correct?

- A It contains carbon dioxide and oxygen only.
- B It contains carbon monoxide and oxygen only.
- C It contains three different elements.
- D It contains two molecules of carbon dioxide.

18 Molten lead(II) bromide is electrolysed using inert electrodes.

What are the products at each electrode?

	anode	cathode
A	bromide ions	lead
B	bromine gas	lead
C	lead	bromine gas
D	lead	bromide ions

19 The initial and final temperatures of four different reactions are measured.

The results are shown.

Which reaction is the most exothermic?

	initial temperature /°C	final temperature /°C
A	21	18
B	21	27
C	23	28
D	24	17

20 In which reactions is the underlined substance oxidised?

- 1 iron when it rusts
- 2 methane when it burns in air
- 3 copper oxide when it reacts with carbon

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

21 Dilute sulfuric acid reacts with aqueous potassium hydroxide.

What are the products of this reaction?

	potassium hydroxide	potassium sulfate	carbon dioxide	water
A	✓	x	✓	✓
B	x	✓	x	✓
C	x	✓	✓	✓
D	x	✓	x	x

key
✓ = yes
x = no

22 The results of two tests on solid P are shown.

	test	result
1	add aqueous sodium hydroxide to solid	gas given off that turns moist red litmus paper blue
2	dissolve solid in water, add dilute aqueous silver nitrate	white precipitate formed

What is P?

- A** aluminium carbonate
- B** aluminium sulfate
- C** ammonium chloride
- D** ammonium nitrate

23 Period 3 of the Periodic Table is shown.

Na	Mg	Al	Si	P	S	Cl	Ar
----	----	----	----	---	---	----	----

Which statement about these elements is correct?

- A** All the elements are metals.
- B** All the elements are non-metals.
- C** Metallic character decreases from Na to Ar.
- D** Proton number decreases from Na to Ar.

24 Which statement about noble gases is correct?

- A** Helium is used to fill filament lamps.
- B** They are all diatomic gases.
- C** Argon and helium are found in clean air.
- D** They are all in Group VII of the Periodic Table.

25 Why are gold alloys, rather than pure gold, used to make jewellery?

- A** Alloys are better electrical conductors.
- B** Alloys are less likely to corrode.
- C** Alloys are harder.
- D** Alloys are less dense.

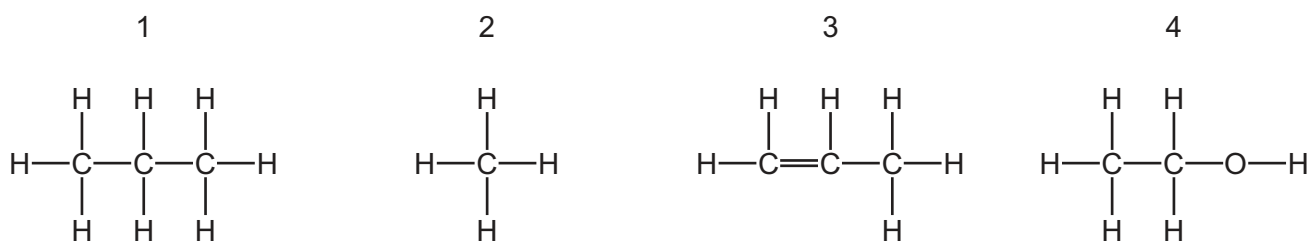
26 Four substances are listed.

- 1 aqueous sodium sulfate
- 2 dilute sulfuric acid
- 3 solid iodine
- 4 white copper(II) sulfate

Which substances turn cobalt(II) chloride from blue to pink?

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

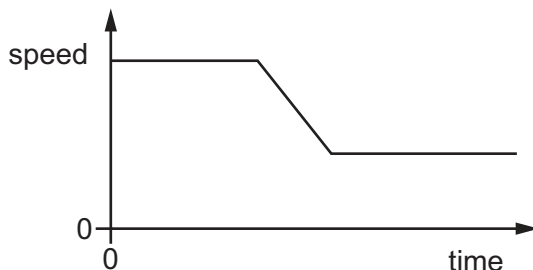
27 The structures of four organic compounds are shown.



Which compounds are alkanes?

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

28 The diagram shows a speed–time graph for part of the journey of a car.



Which statement about the part of the journey shown is correct?

- A** The car travels at a constant speed then decelerates and moves at a slower speed.
B The car travels at a constant speed then decelerates to rest.
C The car travels at a constant speed then reverses its direction.
D The car travels at an increasing speed then slows down.

- 29 A vehicle is taken from the Earth to the Moon where the gravitational field strength is smaller.

How do the mass and the weight of the vehicle on the Moon compare with their values on the Earth?

- A smaller mass and smaller weight
- B smaller mass and the same weight
- C the same mass and smaller weight
- D the same mass and the same weight

- 30 Which statement about air resistance is correct?

- A It acts in the same direction as the direction of motion.
- B It always acts in the opposite direction to the force of gravity.
- C It is a form of friction.
- D It only acts on stationary objects.

- 31 The work done by a force on an object is calculated using the magnitude of the force and only one other quantity.

What is this other quantity?

- A the acceleration of the object
- B the distance moved by the object in the direction of the force
- C the speed of the object
- D the time for which the force acts on the object

- 32 Which form of energy is **not** a form of potential energy?

- A chemical
- B elastic
- C gravitational
- D sound

- 33 What happens as a liquid starts to evaporate?

- A The mass of the remaining liquid increases.
- B The mass of the remaining liquid is constant.
- C The temperature of the remaining liquid decreases.
- D The temperature of the remaining liquid increases.

- 34** The metal lid on a glass jar is difficult to unscrew.

The lid is unscrewed more easily after it is held under hot water.

What is the reason for this?

- A** The jar contracts more than the lid.
- B** The jar expands more than the lid.
- C** The lid contracts more than the jar.
- D** The lid expands more than the jar.

- 35** The word 'LIGHT' is printed on a piece of paper.

The piece of paper is held in front of a vertical mirror with the word 'LIGHT' upright.

A person looks at the mirror and sees an image of the word.

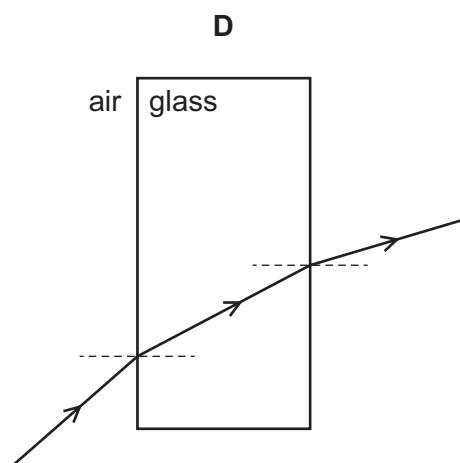
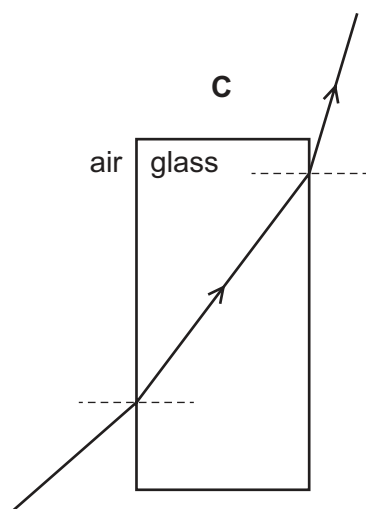
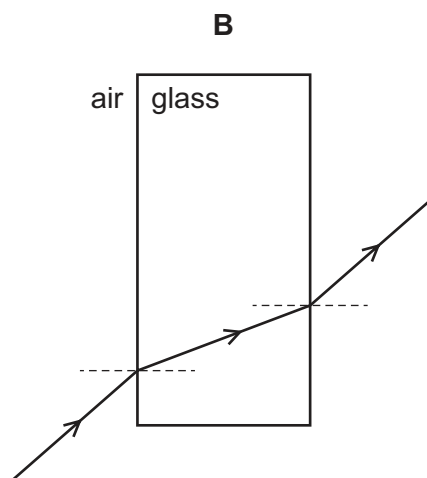
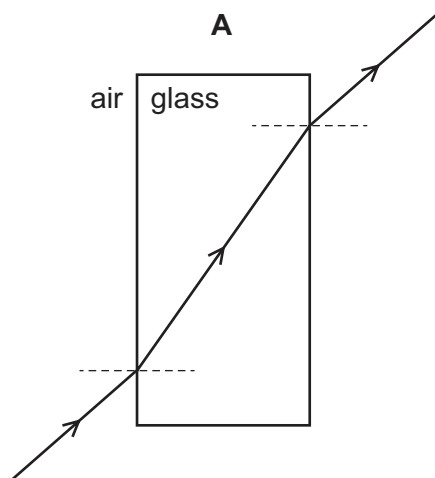
What does the image look like?

A	B	C	D
LIGHT	THGI	LHGI	FICHL

12

36 Light passes through a parallel-sided block of glass.

Which diagram shows how the light passes through the block?

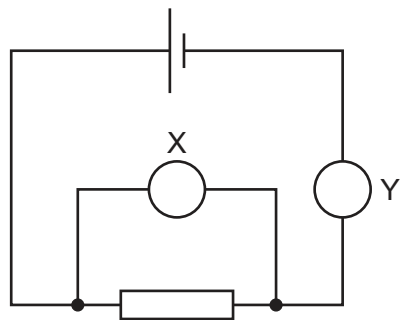


37 Which change makes the pitch of a sound higher?

- A** decreasing the amplitude of the sound wave
- B** decreasing the frequency of the sound wave
- C** increasing the amplitude of the sound wave
- D** increasing the frequency of the sound wave

38 The diagram shows a cell connected to a resistor and two meters, X and Y.

The circuit is used when determining the resistance of the resistor.



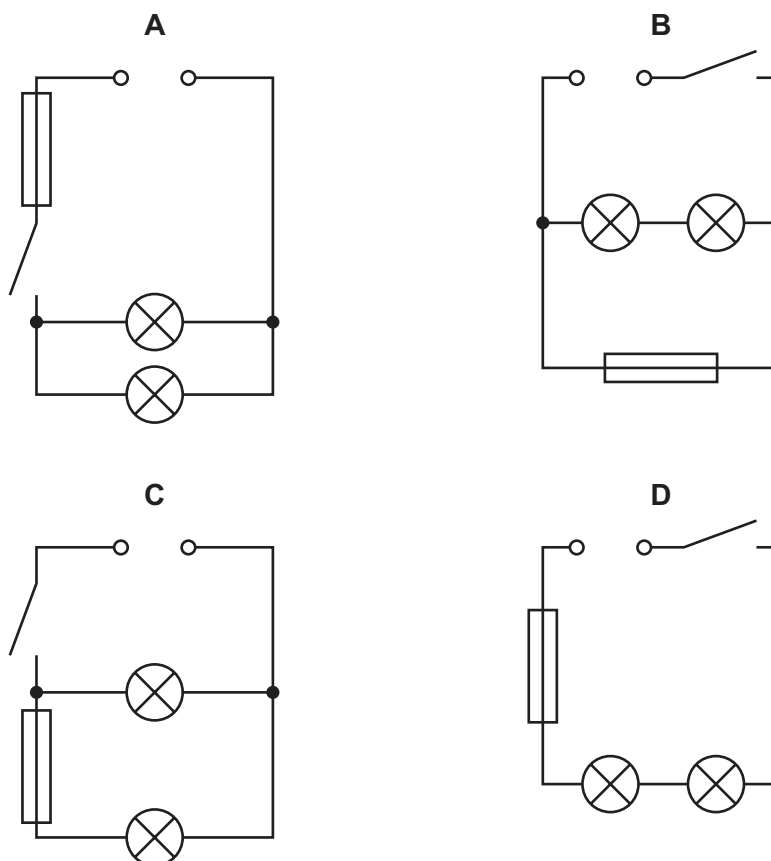
What are the quantities measured by meters X and Y, and what are their correct units?

	meter X		meter Y	
	quantity	unit	quantity	unit
A	current	A	p.d.	V
B	current	V	p.d.	A
C	p.d.	A	current	V
D	p.d.	V	current	A

14

- 39** A circuit contains two lamps connected in parallel. One fuse protects both lamps and one switch operates both lamps.

Which circuit diagram shows this arrangement?



- 40** An electrical appliance with a resistance of $600\ \Omega$ is connected to a $240\ \text{V}$ supply.

Which fuse rating is appropriate to protect the appliance and the wires from overheating if a fault occurs?

- A** 0.04 A **B** 0.5 A **C** 5 A **D** 13 A

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The Periodic Table of Elements

Group																			
I	II											III	IV	V	VI	VII	VIII		
		1Hhydrogen1																	
		Key																	
		atomic number atomic symbol name relative atomic mass																	
3 Li lithium 7	4 Be beryllium 9													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 —		

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.).