



Cambridge IGCSE™

COMBINED SCIENCE

0653/11

Paper 1 Multiple Choice (Core)

October/November 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

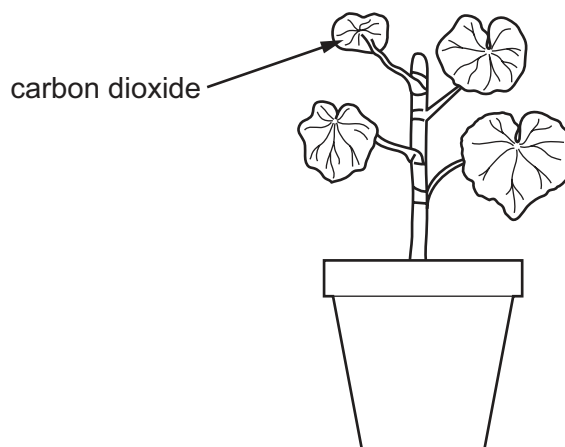
- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

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



2

- 1 The diagram shows a plant absorbing carbon dioxide in order to carry out photosynthesis.



Which characteristic of all living organisms is this?

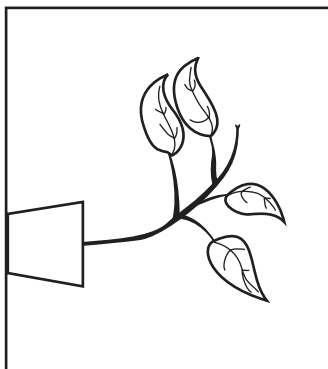
- A movement
 - B nutrition
 - C excretion
 - D reproduction
- 2 What is diffusion?
- A net movement of molecules down a concentration gradient
 - B net movement of molecules up a concentration gradient
 - C total movement of molecules down a concentration gradient
 - D total movement of molecules up a concentration gradient
- 3 What is glycogen made up from?
- A amino acids
 - B fatty acids
 - C glucose
 - D glycerol
- 4 *Chlamydomonas nivalis* is a single-celled organism that lives in snow and ice.
- At which temperature will its enzymes work best?
- A 60 °C
 - B 40 °C
 - C 0 °C
 - D -20 °C

3

- 5** What is the correct definition of a balanced diet?
- A** a diet in which all the components needed to maintain health are present in appropriate proportions
 - B** a diet which contains only carbohydrates, fats and proteins
 - C** a diet which contains mostly protein and dietary fibre
 - D** a diet which contains only vitamins and minerals
- 6** Digestion can be defined as the breakdown of
- A** large insoluble molecules to small soluble molecules.
 - B** small insoluble molecules to large soluble molecules.
 - C** large soluble molecules to small insoluble molecules.
 - D** small soluble molecules to large insoluble molecules.
- 7** By which process does water vapour move out of plant leaves through stomata?
- A** diffusion
 - B** evaporation
 - C** osmosis
 - D** respiration
- 8** Which chemical is used to test for carbon dioxide in expired air?
- A** Benedict's solution
 - B** distilled water
 - C** iodine solution
 - D** limewater

4

- 9 The diagram shows a plant in a pot fixed to the side of a light-proof box.



What is shown by the stem of the plant?

	gravitropism	phototropism
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 10 Which row is correct for sexual reproduction?

	genetically different offspring produced	one parent	zygote produced
A	✓	✓	x
B	✓	x	✓
C	x	✓	x
D	x	x	✓

- 11 What is the correct route of sperm cells from where they are produced to leaving the body?

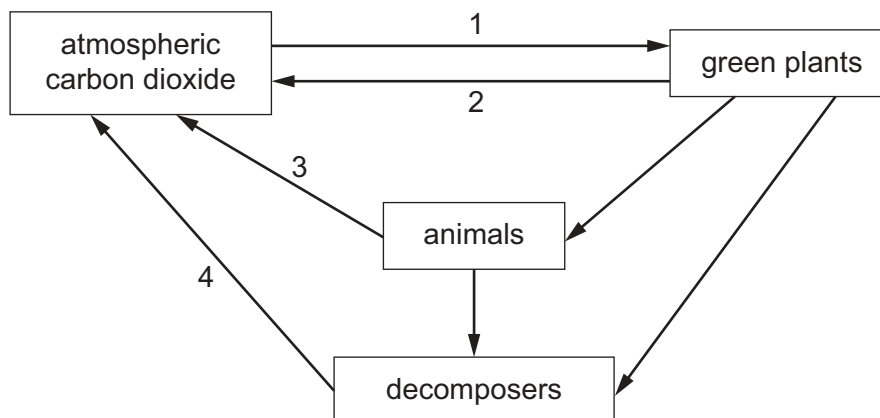
- A** prostate gland → sperm ducts → urethra
B prostate gland → testes → sperm ducts
C testes → sperm ducts → urethra
D testes → urethra → prostate gland

5

12 Which type of organism makes glucose using energy from sunlight?

- A carnivore
- B consumer
- C herbivore
- D producer

13 The diagram represents part of the carbon cycle.



Which arrows show where respiration takes place?

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

14 Which substance is liquid at 25 °C?

	melting point / °C	boiling point / °C
A	−182	−161
B	−100	80
C	−77	−34
D	44	280

15 A solid is added to a liquid and stirred until the solid is no longer visible.

Which word describes the type of mixture that is formed?

- A concentration
- B solute
- C solution
- D solvent

- 16** A compound contains twice as many atoms of caesium, Cs, as atoms of carbon.

The compound contains three times as many atoms of oxygen as atoms of carbon.

What is the formula of the compound?

- A** CsCO_3 **B** Cs_2CO **C** Cs_2CO_3 **D** $2\text{CsC}_3\text{O}$

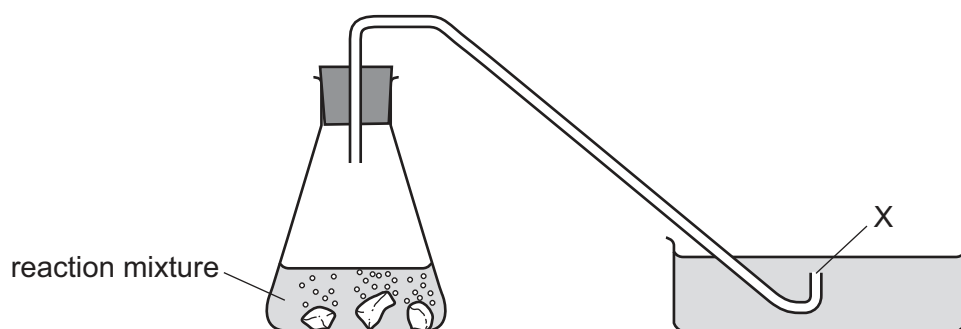
- 17** Which process is endothermic?

- A** boiling water
B burning wood
C freezing water
D neutralising an acid with a base

- 18** A gas is given off during a reaction.

The volume of the gas is measured as it is collected.

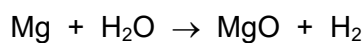
Some of the apparatus used is shown.



Which piece of apparatus is filled with water and placed at position X to collect and measure the gas?

- A** beaker
B conical flask
C measuring cylinder
D pipette
- 19** Magnesium ribbon reacts with steam.

The equation for the reaction is shown.



Which substance is being reduced in this reaction?

- A** H_2 **B** H_2O **C** Mg **D** MgO

7

- 20** Calcium oxide is added to water containing universal indicator. The universal indicator turns blue.

What is the pH of the solution?

- A** 1 **B** 6 **C** 7 **D** 11

- 21** Acid X reacts with metal Y.

A colourless gas is given off and a pale green solution is produced.

Two tests are carried out on the solution.

test	reagents added	result
1	aqueous silver nitrate and dilute nitric acid	white precipitate
2	aqueous sodium hydroxide	green precipitate

What are acid X and metal Y?

	acid X	metal Y
A	hydrochloric	iron
B	hydrochloric	zinc
C	sulfuric	iron
D	sulfuric	zinc

- 22** Which statement describes the elements across the Periodic Table from left to right?

- A** Their atoms contain fewer protons.
B Their atoms contain the same number of electrons.
C They change from gases to solids.
D They change from metals to non-metals.

23 Read the sentences about calcium, copper and bromine.

Calcium, copper and bromine are in the same period of the Periodic Table. The metals react with bromine to form calcium bromide and copper(II) bromide. From the position of these elements in the Periodic Table, it can be predicted that the bonding in the metal bromides is1..... and that2..... coloured. The formula of calcium bromide is3..... .

Which words correctly complete gaps 1, 2 and 3?

	1	2	3
A	covalent	both bromides are	CaBr
B	covalent	only copper(II) bromide is	CaBr ₂
C	ionic	both bromides are	CaBr
D	ionic	only copper(II) bromide is	CaBr ₂

24 Which statements about metals and their compounds are correct?

- 1 Copper reacts with dilute hydrochloric acid to give hydrogen.
- 2 Carbon does not react with aluminium oxide.
- 3 Hydrogen is formed when steam is passed over heated zinc.
- 4 Iron is more reactive than magnesium.

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

25 Which statement about carbon dioxide is **not** correct?

- A** Carbon dioxide is formed when calcium carbonate is heated.
- B** Carbon dioxide is used up during respiration.
- C** Clean air contains less than 1% carbon dioxide.
- D** When fossil fuels are burned, carbon dioxide is produced.

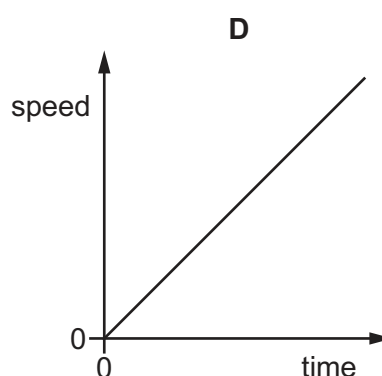
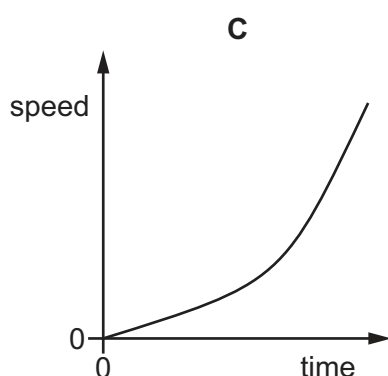
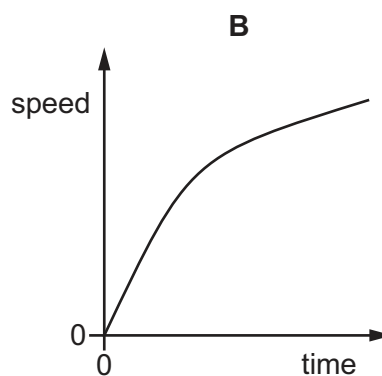
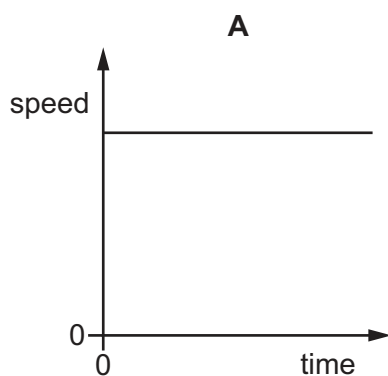
26 Which statement about alkanes is correct?

- A** Their molecules are unsaturated.
- B** They are generally reactive compounds.
- C** They are mixtures of carbon and hydrogen atoms only.
- D** They produce water when they burn.

27 Which process is used to make poly(ethene)?

- A addition polymerisation
- B cracking
- C fractional distillation
- D reacting ethane molecules together

28 Which speed–time graph represents motion for which the acceleration is constant but **not** zero?



29 A glass block has a mass of 30 g and a volume of 15 cm³.

What is the density of the glass?

- A 0.50 g/cm³ B 2.0 g/cm³ C 15 g/cm³ D 450 g/cm³

30 Which property of an object **cannot** be changed by a force?

- A mass
- B motion
- C shape
- D size

10

- 31** A car on a journey travels along a horizontal road at a constant speed of 50 km/h.

Which description of the forces acting on the car during this journey is correct?

	driving force	friction forces
A	constant	equal to driving force
B	constant	less than driving force
C	increasing	decreasing
D	increasing	zero

- 32** A man lifts a heavy load vertically, from the ground to above his head.



He then moves the load horizontally at constant speed.

During which motion is work done on the load, and why?

	work is done	reason
A	when lifting	the force exerted on the load is at right angles to the direction of movement of the load
B	when lifting	the force exerted on the load is in the same direction as the movement of the load
C	when moving horizontally	the force exerted on the load is at right angles to the direction of movement of the load
D	when moving horizontally	the force exerted on the load is in the same direction as the movement of the load

- 33** A girl watches a man hammering a post into the ground.

When she sees the hammer hit the post, she starts a stop-watch.

When she hears the sound of the hammer hitting the post, she stops the stop-watch.

The reading on the stop-watch is 0.60 s. The speed of sound in air is 330 m/s.

What is the distance between the girl and the post?

- A** 99 m **B** 198 m **C** 396 m **D** 550 m

- 34** The molecules in a substance are close together but free to change positions with each other.

Which substance at 20 °C matches this description?

- A** air
B copper
C iron
D water

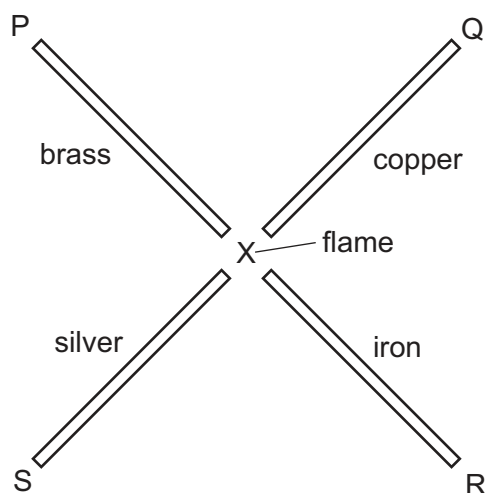
12

35 The diagram shows four rods made of different metals: brass, copper, iron and silver.

The rods have identical dimensions and all start at the same temperature.

A metal ball is fixed by wax to one end of each rod at points P, Q, R and S.

The other end of each rod is heated by a flame at X.



Thermal energy travels along each rod until the wax melts and the metal ball falls.

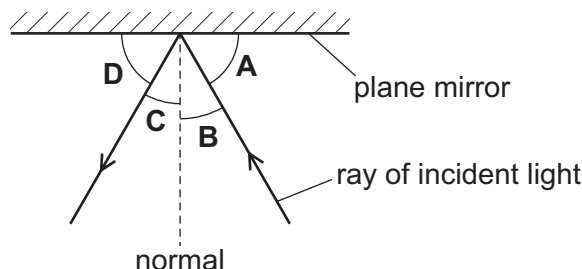
The ball on the silver rod falls first.

How can this be explained?

- A** The rate of conduction of thermal energy is greatest in silver.
- B** The rate of conduction of thermal energy is smallest in silver.
- C** The rate of convection of thermal energy is greatest in silver.
- D** The rate of convection of thermal energy is smallest in silver.

36 The diagram shows light incident on a plane mirror.

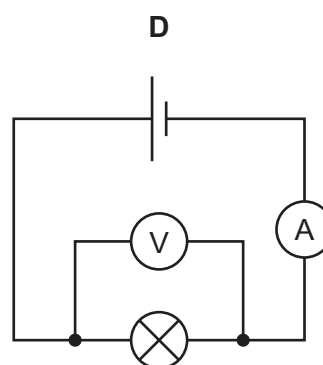
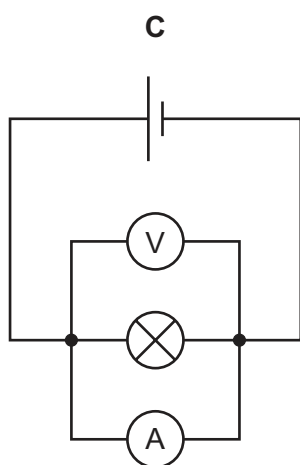
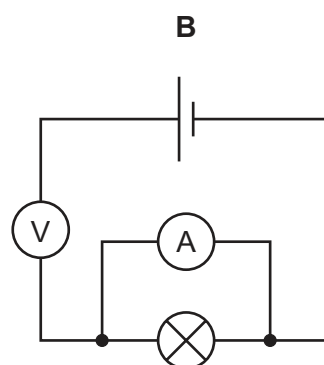
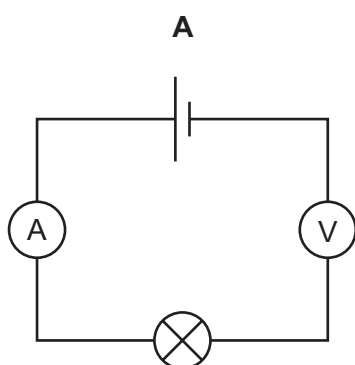
Which labelled angle is the angle of reflection?



- 37** The amplitude of a sound wave decreases and its frequency increases.

What happens to the sound heard?

- A** It becomes louder and its pitch becomes higher.
B It becomes louder and its pitch becomes lower.
C It becomes quieter and its pitch becomes higher.
D It becomes quieter and its pitch becomes lower.
- 38** Which circuit is used to measure the current in the lamp and the potential difference (p.d.) across it?

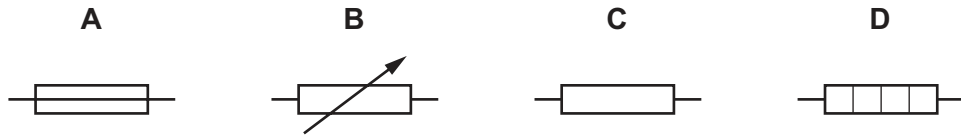


- 39** An electric heater has a resistance of $50\ \Omega$.

It is connected to a power supply with a potential difference (p.d.) of 240 V .

What is the current in the heater?

- A** 0.21 A **B** 4.8 A **C** 190 A **D** 290 A

14**40** Which symbol is used to represent a fixed resistor in an electrical circuit?

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The Periodic Table of Elements

Group																	
I	II	Key					III	IV	V	VI	VII	VIII					
3 Li lithium 7	4 Be beryllium 9	atomic number atomic symbol name relative atomic mass					1 H hydrogen 1						2 He helium 4				
11 Na sodium 23	12 Mg magnesium 24						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 oganeson —

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	europtium	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	merdelevium	—	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.).