

Cambridge IGCSE[™] (9–1)

CO-ORDINATED SCIENCES

0973/12

Paper 1 Multiple Choice (Core)

May/June 2022

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.



- 1 Which statement about the characteristics of living organisms is correct?
 - **A** Excretion is the chemical reactions in cells that release energy.
 - **B** Nutrition is the taking in of materials for energy, growth and development.
 - **C** Respiration is the process that makes more of the same kind.
 - **D** Sensitivity is the removal of toxic materials and excess substances.
- 2 Which statement about cells is correct?
 - **A** Cell membranes are found only in animal cells.
 - **B** Cell membranes are found only in plant cells.
 - **C** Cell walls are found only in animal cells.
 - **D** Cell walls are found only in plant cells.
- **3** Which reagent is used to test for the presence of protein in a food sample?
 - A Benedict's solution
 - **B** biuret
 - **C** ethanol
 - **D** iodine

4 Catalase is an enzyme that breaks down hydrogen peroxide to form a foam of water and oxygen. The maximum height of the foam produced at different temperatures in a given length of time is measured.

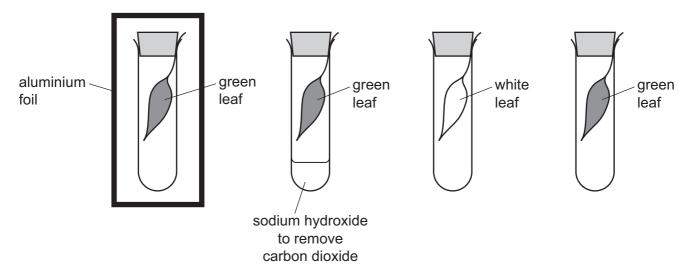
The rate of the reaction is proportional to the height of foam.

The table shows the results.

temperature/°C	height of foam/mm
10	1.2
20	3.1
30	4.2
40	5.4
50	3.6
60	0.0

Which conclusion can be drawn from these results?

- **A** Increasing the temperature decreases the rate of the reaction up to 50 °C.
- **B** Increasing the temperature decreases the rate of the reaction up to 60 °C.
- **C** Increasing the temperature increases the rate of the reaction up to 40 °C.
- **D** Increasing the temperature increases the rate of the reaction up to 50 °C.
- **5** The diagram shows an investigation into factors affecting photosynthesis.



The tubes are left for 24 hours after which the leaves are tested with iodine solution.

How many of these leaves turn blue-black when tested with iodine solution?

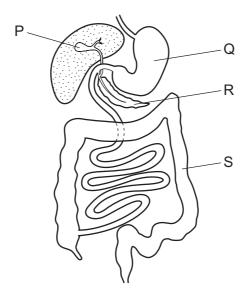
A 1

B 2

C 3

D 4

6 The diagram shows part of the digestive system.



Which labelled parts produce digestive enzymes, absorb water and store bile?

	produce digestive enzymes	absorb water	store bile				
Α	Р	Q	R				
В	Q	R	Р				
С	R	S	Р				
D	S	Р	R				

- 7 Which changes increase the rate of transpiration?
 - 1 increasing temperature
 - 2 increasing humidity
 - 3 decreasing temperature
 - 4 decreasing humidity

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

C 2 and 3 **D** 3 and 4

8 When a person exercises for 10 minutes, what is the effect on the depth and rate of their breathing?

	depth of breathing	rate of breathing
Α	decreases	decreases
В	decreases	increases
С	increases	decreases
D	increases	increases

- **9** What is a hormone?
 - A a chemical substance, produced by a gland, which alters the activity of target organs
 - **B** a protein that acts as a biological catalyst
 - **C** a thread-like structure of DNA, carrying genetic information in the form of genes
 - **D** an electrical signal that travels along a nerve cell to an effector
- 10 Which statement about asexual reproduction is correct?
 - **A** It involves the fusion of gametes from one parent.
 - **B** It involves the fusion of gametes from two parents.
 - **C** It produces offspring which are genetically different.
 - **D** It produces offspring which are genetically identical.
- 11 Selection in chickens has produced individuals that lay more eggs per week.

What is required for this to occur?

	reproduction	selection
Α	asexual	human
В	asexual	natural
С	sexual	human
D	sexual	natural

12 The diagram shows a food chain.

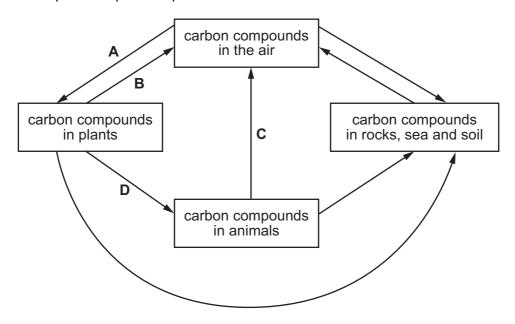
dandelion plant
$$\rightarrow$$
 slug \rightarrow blackbird \rightarrow fox

Which organisms are consumers?

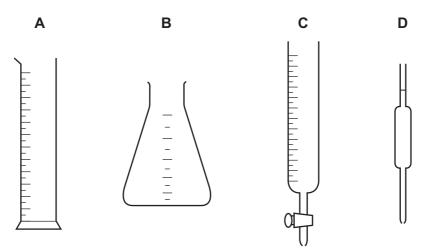
- A dandelion plant only
- **B** fox only
- C blackbird and slug only
- **D** slug, blackbird and fox

13 The diagram shows part of the carbon cycle.

Which arrow represents plant respiration?



14 Which piece of apparatus is used to measure the change in the volume of a liquid most accurately?



D 3 and 4

- 15 Some physical and chemical changes are listed.
 - 1 burning methane
 - 2 dissolving sugar in water
 - 3 evaporating ethanol
 - 4 rusting iron

Which changes are chemical changes?

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

16 Which equation is balanced?

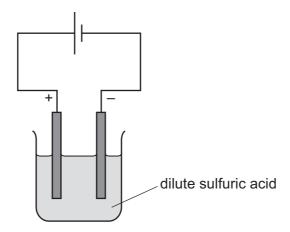
$$\mathbf{A} \quad 2H_2 + O_2 \rightarrow 2H_2O_2$$

$$\textbf{B} \quad \text{MgO} \, + \, 2\text{H}_2\text{SO}_4 \, \rightarrow \, \text{MgSO}_4 \, + \, 2\text{H}_2\text{O}$$

C Na +
$$H_2O \rightarrow NaOH + H_2$$

D Na₂CO₃ + 2HC
$$l \rightarrow$$
 2NaC $l +$ H₂O + CO₂

17 The diagram shows the electrolysis of dilute sulfuric acid using inert electrodes.



Which row shows the products formed at each electrode and describes the bonding in sulfuric acid?

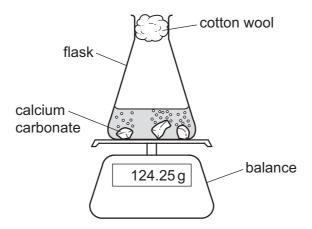
	anode	cathode	type of bonding				
Α	oxygen	hydrogen	ionic				
В	oxygen	hydrogen	covalent				
С	hydrogen	oxygen	ionic				
D	hydrogen	oxygen	covalent				

18 Which word describes reactions that give out heat energy?

- A endothermic
- **B** exothermic
- **C** oxidation
- **D** reduction

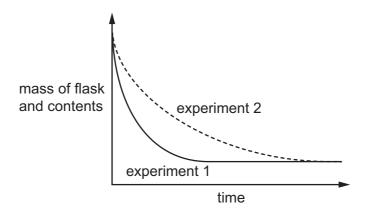
19 When solid pieces of calcium carbonate are added to dilute hydrochloric acid in a flask, carbon dioxide gas is given off.

The mass of the flask and its contents are measured over time.



Two different experiments are carried out. In both experiments the acid is in excess.

The results of these two experiments are shown.



Which statement explains the different shapes of the curves?

- A Experiment 2 uses a catalyst.
- **B** Experiment 2 uses acid at a higher temperature.
- **C** Experiment 2 uses acid that is more dilute.
- **D** Experiment 2 uses powdered calcium carbonate.
- **20** When aqueous potassium hydroxide is warmed with ammonium chloride, a gas is given off.

Which test result identifies the gas?

- A It bleaches pH paper.
- **B** It turns anhydrous cobalt(II) chloride blue.
- C It turns universal indicator red.
- **D** It turns red litmus blue.

21 A gas is used in welding metals together at high temperatures.

The gas is used to provide an inert atmosphere.

What is the gas?

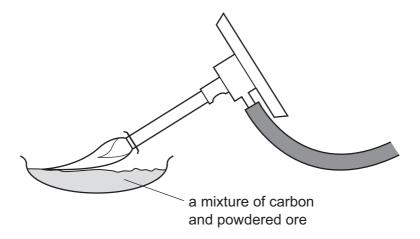
- **A** argon
- **B** carbon dioxide
- **C** fluorine
- **D** oxygen
- 22 Which row does **not** link a general physical property to the type of element?

	type of element	general physical property
Α	metal	malleable
В	metal	thermal conductor
С	non-metal	electrical conductor
D	non-metal	low melting point

23 Which row describes a transition element?

	melting point/°C	electrical conductor
Α	115	no
В	181	yes
С	1538	yes
D	4726	no

24 The diagram shows a metal being extracted from its powdered ore using carbon.



What happens to the ore in this reaction?

- A It burns.
- B It decomposes.
- C It is oxidised.
- **D** It is reduced.

25 Which colour change is observed when water is tested using copper(II) sulfate?

- **A** blue \rightarrow pink
- **B** blue \rightarrow white
- \mathbf{C} white \rightarrow blue
- **D** white \rightarrow pink

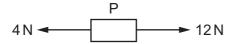
26 Why do farmers add limestone to soil?

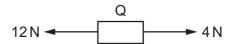
- A It acts as a fertiliser.
- **B** It adds nitrogen to the soil.
- **C** It decreases the pH of the soil.
- **D** It increases the pH of the soil.

27 What are the products of the complete combustion of ethanol?

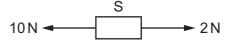
- A carbon dioxide and hydrogen
- B carbon dioxide and water
- C carbon monoxide and hydrogen
- **D** carbon monoxide and water

- 28 What does the area under a speed-time graph represent?
 - **A** acceleration
 - B average speed
 - C distance travelled
 - **D** total time taken
- 29 The diagrams show the two forces acting on four objects P, Q, R and S.









Which two objects experience equal resultant forces acting in the same direction?

- A P and Q
- **B** P and R
- C Q and R
- **D** Q and S
- **30** A student lifts a box vertically from the floor and places it on a table.

Which two quantities must be known in order to calculate the work done on the box by the student?

- A the force used to lift the box and the height of the table
- **B** the force used to lift the box and the time taken to lift the box
- **C** the volume of the box and the height of the table
- **D** the volume of the box and the time taken to lift the box
- 31 Which energy resource does **not** use a turbine and generator to produce electricity?
 - A geothermal
 - **B** nuclear fission
 - C solar cells
 - **D** wind

32 What are used as the fixed points on the Celsius scale of temperature?

	lower fixed point	upper fixed point
Α	melting point of salt solution	boiling point of pure ethanol
В	melting point of salt solution	boiling point of pure water
С	melting point of pure ice	boiling point of pure ethanol
D	melting point of pure ice	boiling point of pure water

33 What happens to the temperature of a substance as it is melting and as it is boiling?

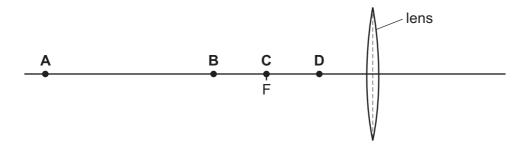
	melting	boiling						
Α	decreases	increases						
В	decreases	no change						
С	increases	increases						
D	no change	no change						

34 A thin, converging lens produces an inverted, enlarged image of an object.

The image is formed on a screen.

F is a principal focus of the lens.

Which labelled point is a possible position for the object?

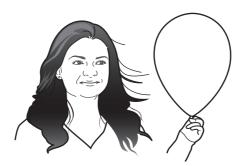


35 Which statement about the electromagnetic spectrum is correct?

- A Gamma-radiation has a lower frequency than visible light.
- **B** Infrared radiation has a higher frequency than radio waves.
- **C** Microwaves have a smaller wavelength than ultraviolet radiation.
- **D** X-rays have a larger wavelength than visible light.

36 A student rubs a balloon against her hair. Electrons are transferred from the hair onto the balloon, and the hair and the balloon both become charged.

The hair is now attracted to the balloon.

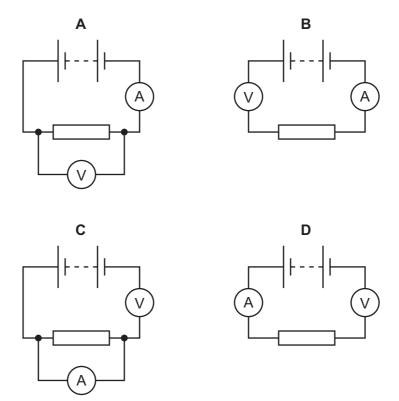


Which row shows the charges on the hair and on the balloon after rubbing?

	charge on hair	charge on balloon
Α	negative	negative
В	negative	positive
С	positive	negative
D	positive	positive

37 A student connects a circuit to determine the resistance of a resistor.

Which circuit enables the current in the resistor and the potential difference (p.d.) across it to be measured?

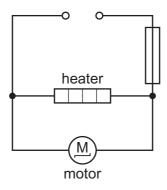


38 Which row shows how lamps are connected in a lighting circuit in a house and gives an advantage of connecting them in this way?

	how lamps are connected	advantage of connecting them in this way					
Α	in parallel they can be switched separa						
В	in parallel they share the voltage						
С	in series	they can be switched separately					
D	in series	they share the voltage					

39 The diagram shows a circuit containing an electric heater, a motor and a fuse.

The current in the heater is 6.0 A and the current in the motor is 2.0 A.



What is an appropriate rating for the fuse?

- **A** 2A
- **B** 4A
- **C** 6A
- **D** 10 A

40 An atom of beryllium is represented by 9_4 Be.

How many neutrons are in the nucleus of this type of beryllium atom?

- **A** 4
- **B** 5
- C
- **D** 13

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

The Periodic Table of Elements

	\	2:	Не	helium 4	10	Ne	neon 20	18	Ar	argon 40	36	궃	krypton 84	54	Xe	xenon 131	98	格	radon			
	IIA				6	ш	fluorine 19	17	Cl	chlorine 35.5	35	ğ	bromine 80	53	Н	iodine 127	85	¥	astatine _			
	I				8	0	oxygen 16	16	ഗ	sulfur 32	34	Se	selenium 79	52	<u>e</u>	tellurium 128	84	Ъ	polonium -	116	^	livermorium -
	>				7	z	nitrogen 14	15	۵	phosphorus 31	33	As	arsenic 75	51	Sp	antimony 122	83	Ξ	bismuth 209			
	2				9	O	carbon 12	14	Si	silicon 28	32	Ge	germanium 73	90	Sn	tin 119	82	Pb	lead 207	114	Εl	flerovium -
	≡				2	Δ	boron 11	13	Αl	aluminium 27	31	Ga	gallium 70	49	In	indium 115	81	11	thallium 204			
											30	Zu	zinc 65	48	g	cadmium 112	80	Я	mercury 201	112	ပ်	copernicium -
	-										29	ŋ	copper 64	47	Ag	silver 108	62	Au	gold 197	111	Rg	roentgenium -
dn											28	Z	nickel 59	46	Pd	palladium 106	78	귙	platinum 195	110	Ds	darmstadtium -
Group											27	ဝိ	cobalt 59	45	格	rhodium 103	77	Ľ	iridium 192	109	¥	meitnerium -
		- :	I	hydrogen 1							26	Fe	iron 56	44	Ru	ruthenium 101	9/	SO	osmium 190	108	Hs	hassium -
					J						25	Mn	manganese 55	43	ည	technetium -	75	Re	rhenium 186	107	Bh	bohrium —
						loc	SS				24	ပ်	chromium 52	42	Mo	molybdenum 96	74	>	tungsten 184	106	Sg	seaborgium -
				Key	atomic number	atomic symbo	name relative atomic mass				23	>	vanadium 51	41	qN	niobium 93	73	<u>Б</u>	tantalum 181	105	Q D	dubnium —
					10	ato	rela				22	i=	titanium 48	40	Zr	zirconium 91	72	茔	hafnium 178	104	꿆	rutherfordium —
											21	လွ	scandium 45	39	>	yttrium 89	57–71	lanthanoids		89–103	actinoids	
	=				4	Be	beryllium 9	12	Mg	magnesium 24	20	Ca	calcium 40	38	Š	strontium 88	56	Ba	barium 137	88	Ra	radium -
	_				3	:=	lithium 7	11	Na	sodium 23	19	¥	potassium 39	37	В	rubidium 85	55	Cs	caesium 133	87	ᇁ	francium -

02 69 89 29 99	Dy Ho Er Tm Yb	ım dysprosium holmium erbium thulium yterbium lutetium 175 169 173 175	98 99 100 101 102	Cf Es Fm Md No	californium einsteinium fermium mendelevium nobelium is
65	Q D	terbium 159	26	益	berkeliur
64	gq	gadolinium 157	96	Cu	curium
63	Ш	europium 152	92	Am	americium
62	Sm	samarium 150	94	Pu	plutonium
61	Pm	promethium -	93	ď	neptunium _
09		neodymium 144			
29	P	praseodymium 141	91	Ра	protactinium 231
28	Oe	cerium 140	06	Т	thorium 232
25	Гa	lanthanum 139	68	Ac	actinium _
	lanthanoids			actinoids	

The volume of one mole of any gas is $24\,\mathrm{dm}^3$ at room temperature and pressure (r.t.p.).