

Cambridge Lower Secondary Checkpoint

CANDIDATE NAME		
CENTRE NUMBER	CANDIDATE NUMBER	



SCIENCE 0893/02

Paper 2 October 2024

45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer all questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do not use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should show all your working in the booklet.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [].

1	This question is about characteristics between individuals.	
	(a) Complete the sentence.	
	The differences in characteristics between individuals of the same species is	
	called	[1]
	(b) DNA in genes determines characteristics in humans.	
	Write down three characteristics determined only by genes.	
	1	
	2	
	3	[3]
		[-]
2	The crust of the Earth is made of large tectonic plates.	
	Explain how the fossil record and the alignment of magnetic materials in the crust are evidence for tectonic plates.	се
	fossil record	
	alignment of magnetic materials	
		[3]

3 Look at the diagram of part of the Periodic Table of the elements.

		Н						He
Li	Ве		В	O	Ν	0	F	Ne
Na	Mg		Αl	Si	Р	S	Cl	Ar
K	Са	transition elements						

	(a)	(i	The	electronic	structure	of	lithium	is	2	1
١	u	,	, ,,,,	CICCLICIIIC	Structure	\mathbf{v}	IIII IIIIII	10	∠.	

Write down the electronic structure of aluminium.

[1]	1
 ٠.	-

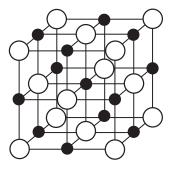
(ii) How many protons are there in one atom of sodium?

[1]
Г.1

(b) Look at the diagram of the structure of magnesium oxide.

Key

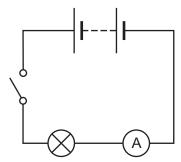
- oxide ion, O²⁻
- magnesium ion, Mg²⁺



Write down the type of bonding in magnesium oxide.

Explain your answer using information from the diagram.

4 Ahmed makes this electrical circuit.



(a) Write down the name of these components.



[1]

(b) Ahmed investigates the effect of adding more lamps to his circuit.

Ahmed measures the **current** in the circuit when there:

- is one lamp
- are two lamps in series
- are three lamps in series
- are four lamps in series.

Suggest a hypothesis that Ahmed makes about the **current** in the circuits in his investigation.

Explain your answer.

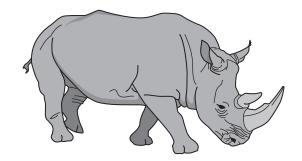
[2]

	5	
(c)	Identify one safety hazard in this investigation.	
	safety hazard	
	Describe how this safety hazard is reduced.	
	reduced by	
		[2]
Loc	ok at the map showing the position of the tectonic plates.	
	A B	
(a)	Which location, A , B , C or D , is most likely to have the largest number of volcanoes?	
		[1]
(h)	Write down the name of the process that causes the tectonic plates to move	

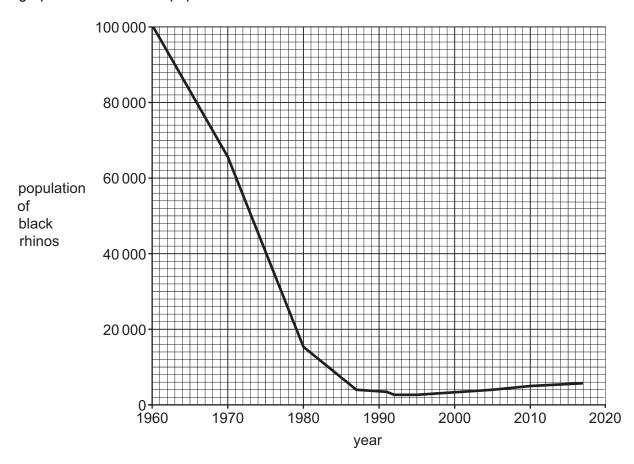
[1]

5

6 The drawing shows a black rhino.



The graph shows the world population of black rhinos.



Write down **two** reasons for the trend in the world population of black rhinos.

1	
2	
	[2]

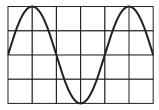
			-		
7	Ма	gnesium reacts with zinc sulfate solu	ution.		
	A d	isplacement reaction happens.			
	(a)	Complete the word equation for the	e reaction.		
		magnesium + zinc sulfate ——▶		+	
					[1
	(b)	Copper is added to zinc sulfate sol	ution.		
		Explain why there is no reaction.			
		Tick (\checkmark) the correct answer.			
		Copper sulfate is more reactive that	an zinc sulfate.		
		Zinc sulfate is more reactive than c	copper sulfate.		

Zinc is more reactive than copper.

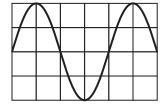
Copper is more reactive than zinc.

[1]

- 8 This question is about sound waves.
 - (a) Look at these two identical sound waves.

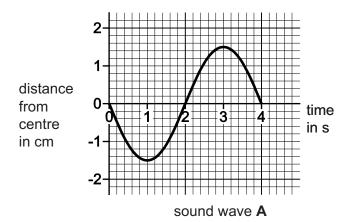


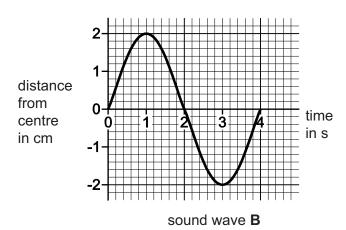
and



	Which word describes how these two identical sound waves interact?
[1]	

(b) Sound wave A interacts with sound wave B.



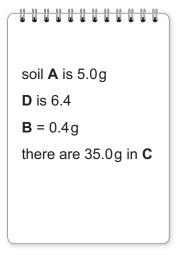


(i)	Write down one similarity between the new sound wave produced and sound wave A .				
			[1]		
(ii)	Complete the sentences.				
	The loudness of the new sound wave is	than sound wave	A.		
	This is because the waveform of the new sound wave has a smaller				
	·				

[2]

9 Yuri investigates the mass of magnesium salts in 1 kg samples of four different soils **A**, **B**, **C** and **D**.

He writes his results in a notebook.

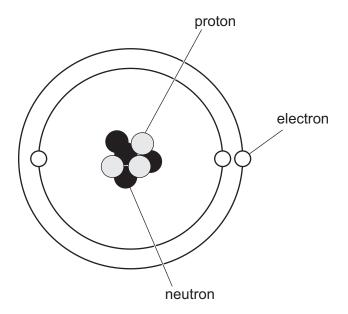


Draw a table and write **all** the results from the notebook in your table.

Include the headings.

[3]

10 The diagram shows the modern model of the structure of an atom.



((a)) This	model	mav	change	in	the	future
М		,	model	111 4 y	onango			IGLAIC

Explain why.	
	[1]

(b) The chemical formula for water is H_2O .

Look at the information about two other chemical formulae.

The formula of:

- iron oxide contains 2 atoms of iron and 3 atoms of oxygen
- sodium carbonate contains 2 atoms of sodium, 1 atom of carbon and 3 atoms of oxygen.

Write down the chemical formula for iron oxide **and** the chemical formula for sodium carbonate.

iron oxide	
sodium carb	

[2]

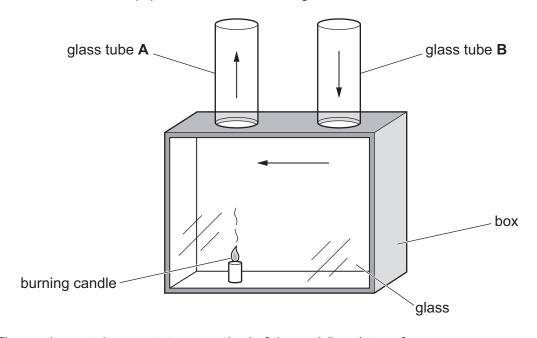
- **11** This question is about thermal energy.
 - (a) Mia holds a handwarmer.

The handwarmer produces 1250 J of thermal energy.

Only 900 J of thermal energy transfers to her hand from the handwarmer.

Calculate how much thermal energy dissipates to the surroundings.

(b) Mia assembles the equipment shown in the diagram.



The equipment demonstrates a method of thermal (heat) transfer.

The arrows in the diagram show the air flow in glass tube **A**, the box and glass tube **B**.

Explain why the air flows in the direction of the arrows.

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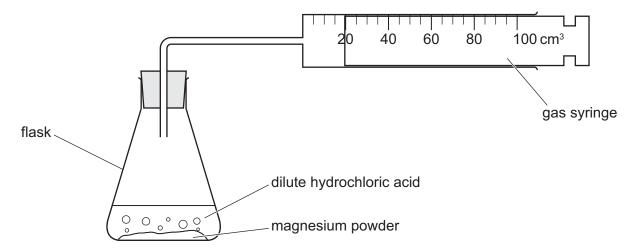
12	This question is a	oout processes	in the car	bon cycle.
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((a)	Draw a	straight	line to	match	each	process	to its	correct	descri	ption.

	process	description
	respiration	breakdown of dead organisms
	feeding	releases energy in cells
	decomposition	a chemical reaction between a fossil fuel and oxygen
	combustion	obtaining nutrients from other organisms
		[2
(b)	How many of these proces	sses release carbon dioxide into the air?
		[1
(c)	Write down which one of t activity.	hese processes has increased in the last 100 years due to human
	Explain your answer.	
	process	
	explanation	
		[1
(d)	Write down the name of o	ne other process in the carbon cycle.
		[1

13 Chen investigates the reaction between magnesium and dilute hydrochloric acid.

Look at the diagram of the equipment he uses.



Chen:

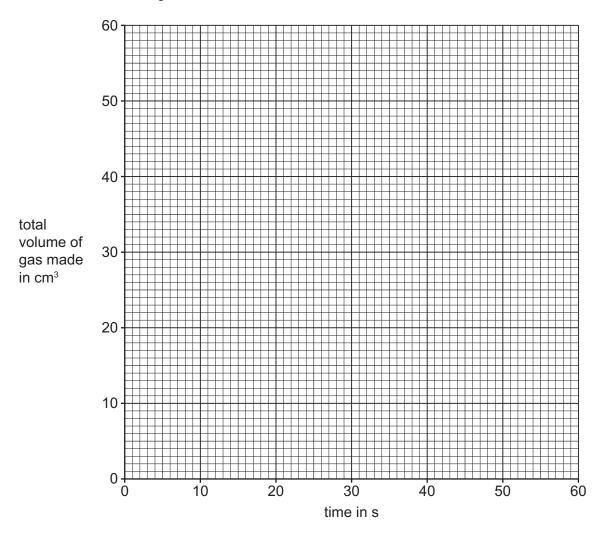
- adds 50 cm³ of dilute hydrochloric acid to the flask
- then adds 0.5 g of magnesium powder to the flask
- takes readings of the total volume of gas made every 10 s during the reaction.

Look at the table of his results.

time in s	total volume of gas made in cm ³
0	0
10	20
20	35
40	49
50	50
60	50

(a) (i) Complete Chen's	graph by
-------------------------	----------

- plotting all the points
- · drawing the curve of best fit.



(ii) Chen does not measure the total volume of gas made in 30 s.

Predict the total volume of gas made in 30 s.

volume of gas made in 30 s = cm³ [1]

[2]

(b) Chen repeats the experiment using **lumps** of magnesium.

The rate of this reaction is slower.

Explain why using the particle model.

[2]

14 Jamila and Lily discuss fetal development. Jamila says, 'I read on the internet that a mother can eat anything she likes when she is pregnant and it will not harm the fetus.' Lily says, 'I don't agree. I think a good diet is very important for fetal development.' Who do you agree with? Give one reason for your answer. [1] **15** Plants use water in photosynthesis. (a) Write down the word equation for photosynthesis. [2] (b) Photosynthesis needs an energy source. What is the energy source for photosynthesis?

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The Periodic Table of Elements

																							Т
	80	2	He	helium 4	10	Ne	neon 20	18	Ā	argon 40	36	궃	krypton 84	54	Xe	xenon 131	98	R	radon	118	Og	oganesson	
	7				6	ш	fluorine 19	17	Cl	chlorine 35.5	35	Ä	bromine 80	53	Н	iodine 127	85	Αţ	astatine	117	<u>s</u>	tennessine	
	9				8	0	oxygen 16	16	S	sulfur 32	34	Se	selenium 79	52	Б	tellurium 128	8	Ъо	polonium	116	_	livermorium	
	2				7	z	nitrogen 14	15	۵	phosphorus 31	33	As	arsenic 75	51	Sb	antimony 122	83	:E	bismuth 209	115	Mc	moscovium	
	4				9	O	carbon 12	41	S	silicon 28	32	Ge	germanium 73	90	Sn	tin 119	82	Вр	lead 207	114	Εl	flerovium	
	က				2	Ф	boron 11	13	Αί	aluminium 27	31	Ga	gallium 70	49	In	indium 115	81	1L	thallium 204	113	Ł	nihonium	_
											30	Zu	zinc 65	48	g	cadmium 112	80	βĤ	mercury 201	112	5	copernicium	_
											59	Cn	copper 64	47	Ag	silver 108	62	Αu	gold 197	111	Rg	roentgenium	
dn											28	z	nickel 59	46	Pq	palladium 106	78	₹	platinum 195	110	Ds	darmstadtium -	
Group											27	රි	cobalt 59	45	몬	rhodium 103	77	'n	iridium 192	109	Ψ	meitnerium -	
		1	I	hydrogen 1							26	Fe	iron 56	44	Ru	ruthenium 101	92	SO	osmium 190	108	Hs	hassium	
					_						25	M	manganese 55	43	ည	technetium -	75	Re	rhenium 186	107	В	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	g	niobium 93	73	Б	tantalum 181	105	90	dubnium	
						ato	rela				22	F	titanium 48	40	Zr	zirconium 91	72	士	hafnium 178	104	꿒	rutherfordium	
								_			21	လွ	scandium 45	39	>	yttrium 89	57-71	lanthanoids		89–103	actinoids		
	2				4	Be	beryllium 9	12	Mg	magnesium 24	20	Ca	calcium 40	38	ഗ്	strontium 88	56	Ba	barium 137	88	Ra	radium	
	_				3	:=	lithium 7	1	Na	sodium 23	19	×	potassium 39	37	&	rubidium 85	55	S	caesium 133	87	ъ́	francium	
					-			1														_	-

Lu Lu	lutetium 175	103	۲	lawrencium -	
⁶ X	ytterbium 173	102	%	nobelium	
e9 Tm	thulium 169	101	Md	mendelevium -	
® 可	erbium 167	100	Fn	fermium	
67 Ho	holmium 165	66	Es	einsteinium –	
ee Dy	dysprosium 163	86	ర్	californium -	
e5 Tb	terbium 159	26	Ř	berkelium	
Gd Gd	gadolinium 157	96	Cm	curium	
63 Eu	europium 152	92	Am	americium	
ss Sm	samarium 150	94	Pn	plutonium	
Pm	promethium -	93	ď	neptunium –	
。 9 N	neodymium 144	92	\supset	uranium 238	
.59 P	praseodymium 141	91	Ъа	protactinium 231	
Se Oe	cerium 140	06	Ч	thorium 232	
57 La	lanthanum 139	88	Ac	actinium	

lanthanoids

actinoids