Cambridge Assessment International Education

Cambridge Lower Secondary Checkpoint

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

3237352797

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 [ ].

This document has **20** pages. Any blank pages are indicated.

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.

fossil record .....

.....

.....

alignment of magnetic materials .....

.....

.....

[3]

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

		H						He
Li	Be			B	C	N	O	F	Ne
Na	Mg			Al	Si	P	S	Cl	Ar
K	Ca	transition elements						

(a) (i) The electronic structure of lithium is 2.1.

Write down the electronic structure of aluminium.

.....

[1]

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

.....

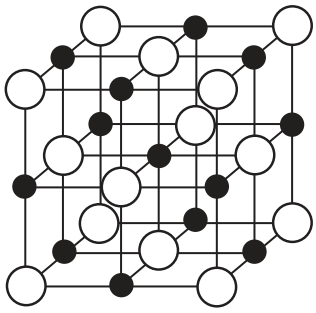
[1]

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

Key

○ oxide ion, O^{2-}

● magnesium ion, Mg^{2+}



Write down the **type** of bonding in magnesium oxide.

.....

Explain your answer using information from the diagram.

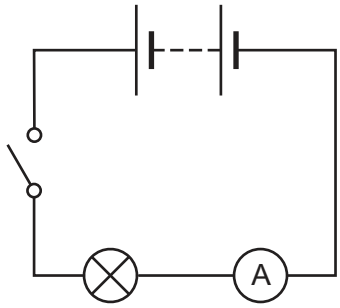
.....

.....

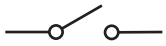
.....

[2]

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]

(c) Identify **one** safety hazard in this investigation.

safety hazard .....

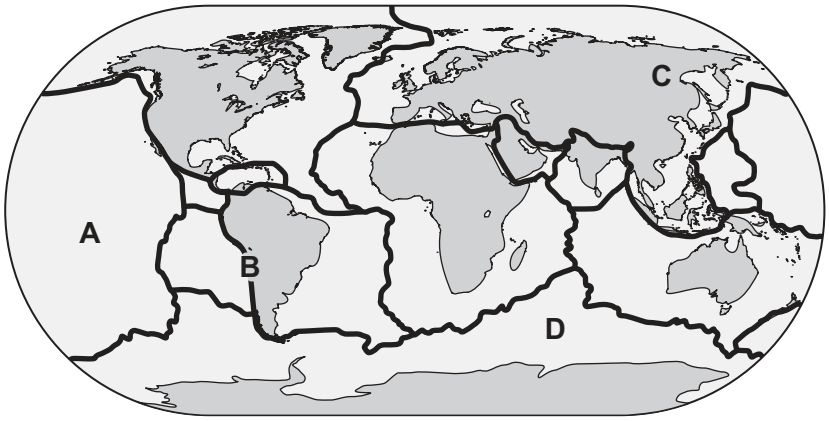
Describe how this safety hazard is reduced.

reduced by .....

.....

[2]

5 Look at the map showing the position of the tectonic plates.



(a) Which location, **A**, **B**, **C** or **D**, is most likely to have the largest number of volcanoes?

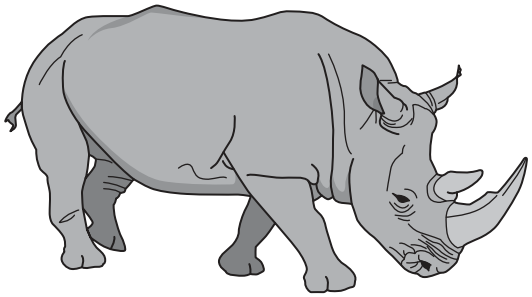
.....

[1]

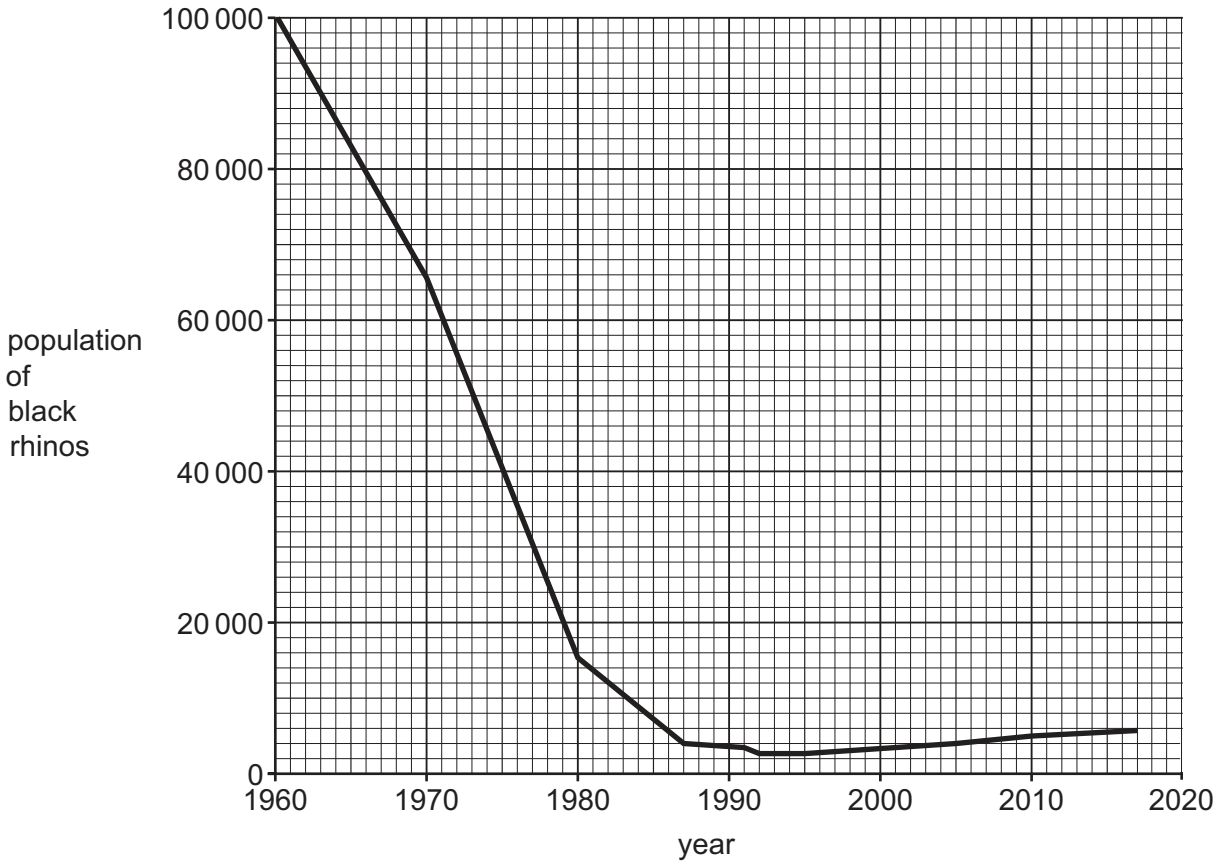
(b) Write down the name of the process that causes the tectonic plates to move.

..... [1]

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 Magnesium reacts with zinc sulfate solution.

A displacement reaction happens.

(a) Complete the **word** equation for the reaction.

magnesium + zinc sulfate ⟶ ..... + ...

[1]

(b) Copper is added to zinc sulfate solution.

Explain why there is **no** reaction.

Tick (✓) the correct answer.

Copper sulfate is more reactive than zinc sulfate. ☐

Zinc sulfate is more reactive than copper sulfate. ☐

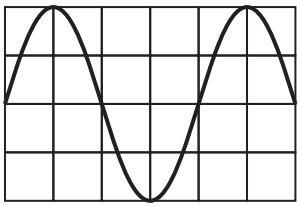
Zinc is more reactive than copper. ☐

Copper is more reactive than zinc. ☐

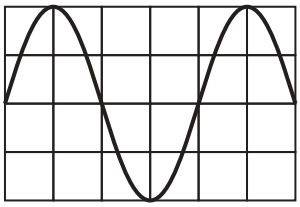
[1]

8 This question is about sound waves.

(a) Look at these two identical sound waves.



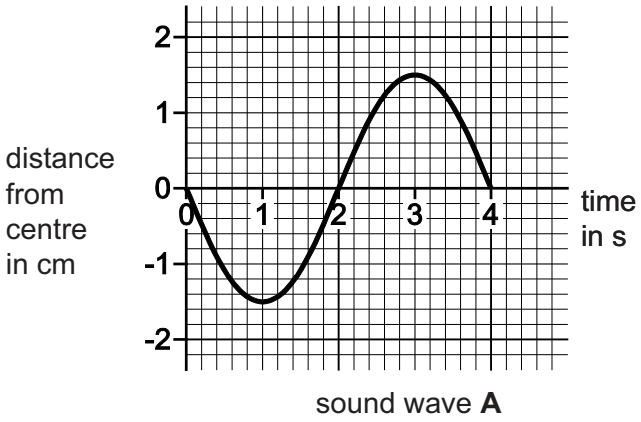
and



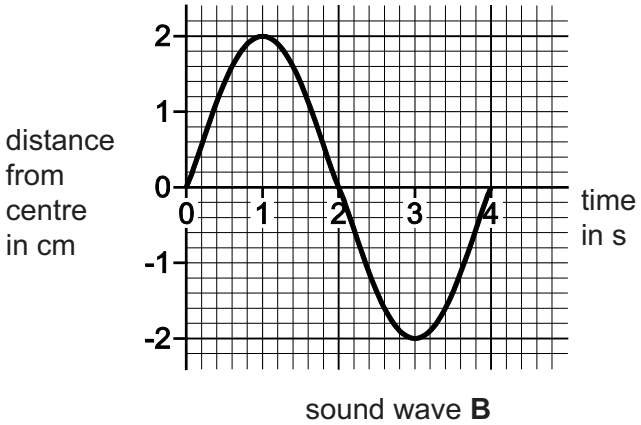
Which word describes how these two identical sound waves interact?

..... [1]

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



sound wave **A**



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**.

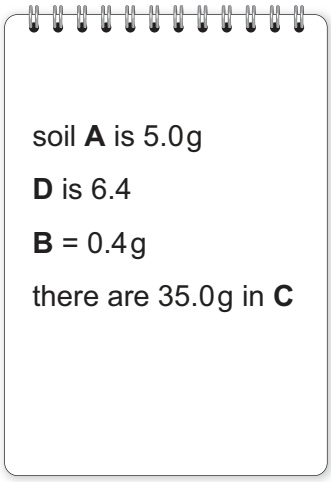
This is because the waveform of the new sound wave has a smaller

.....

[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.

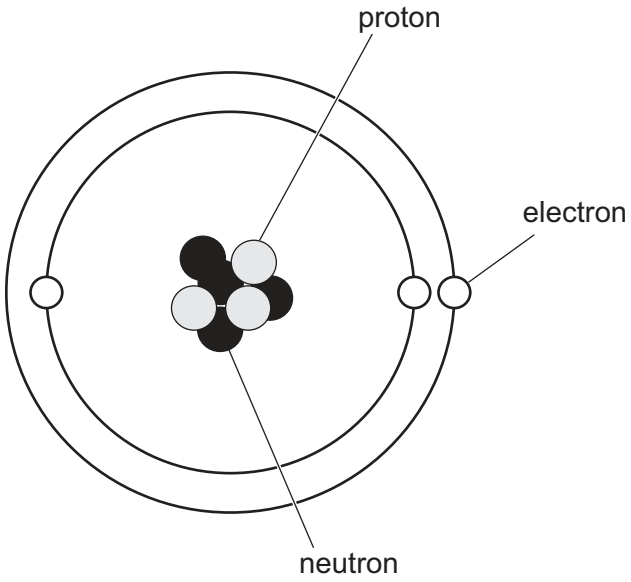


Draw a table and write **all** the results from the notebook in your table.

Include the headings.

[3]

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



(a) This model may change in the future.

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 carbonate .....

[2]

11 This question is about thermal energy.

(a) Mia holds a handwarmer.

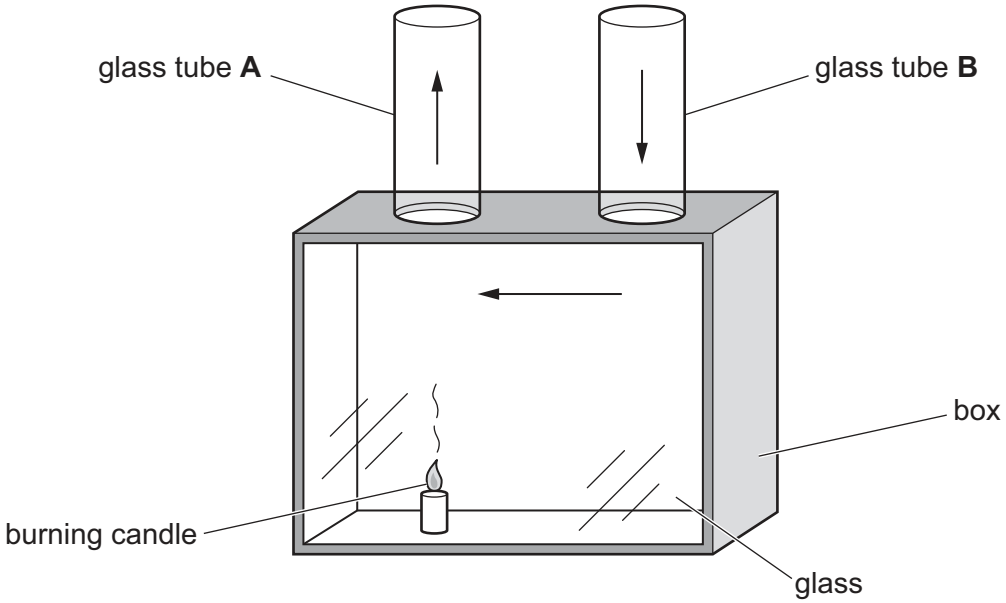
The handwarmer produces 1250 J of thermal energy.

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

Calculate how much thermal energy dissipates to the surroundings.

thermal energy = ... J [1]

(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.

.....

.....

.....

.....

..... [3]

12 This question is about processes in the carbon cycle.

(a) Draw a straight line to match each **process** to its correct **description**.

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 processes release carbon dioxide **into** the air?

.....

[1]

(c) Write down which **one** of these processes has increased in the last 100 years due to human activity.

Explain your answer.

process .....

explanation .....

.....

[1]

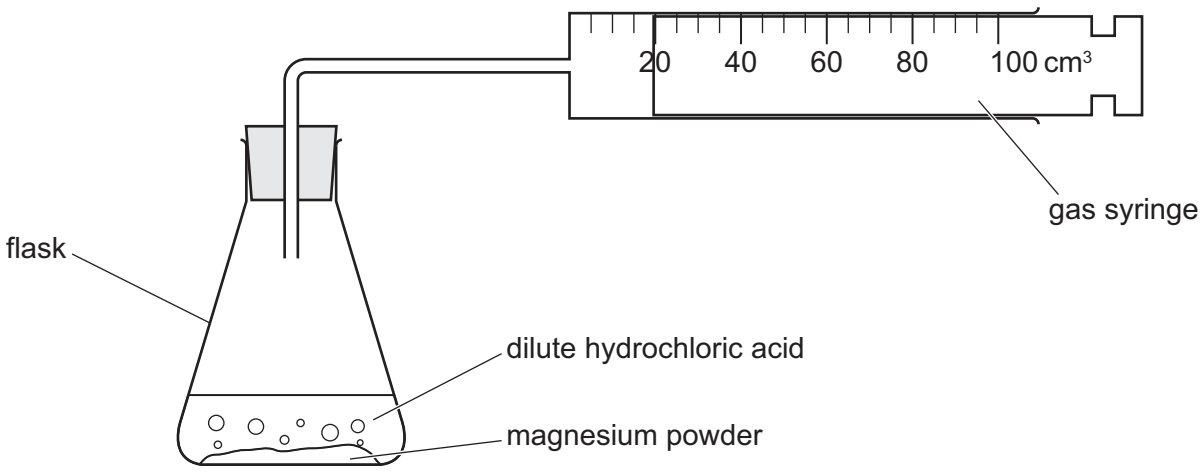
(d) Write down the name of **one other** process in the carbon cycle.

.....

[1]

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

Look at the diagram of the equipment he uses.



Chen:

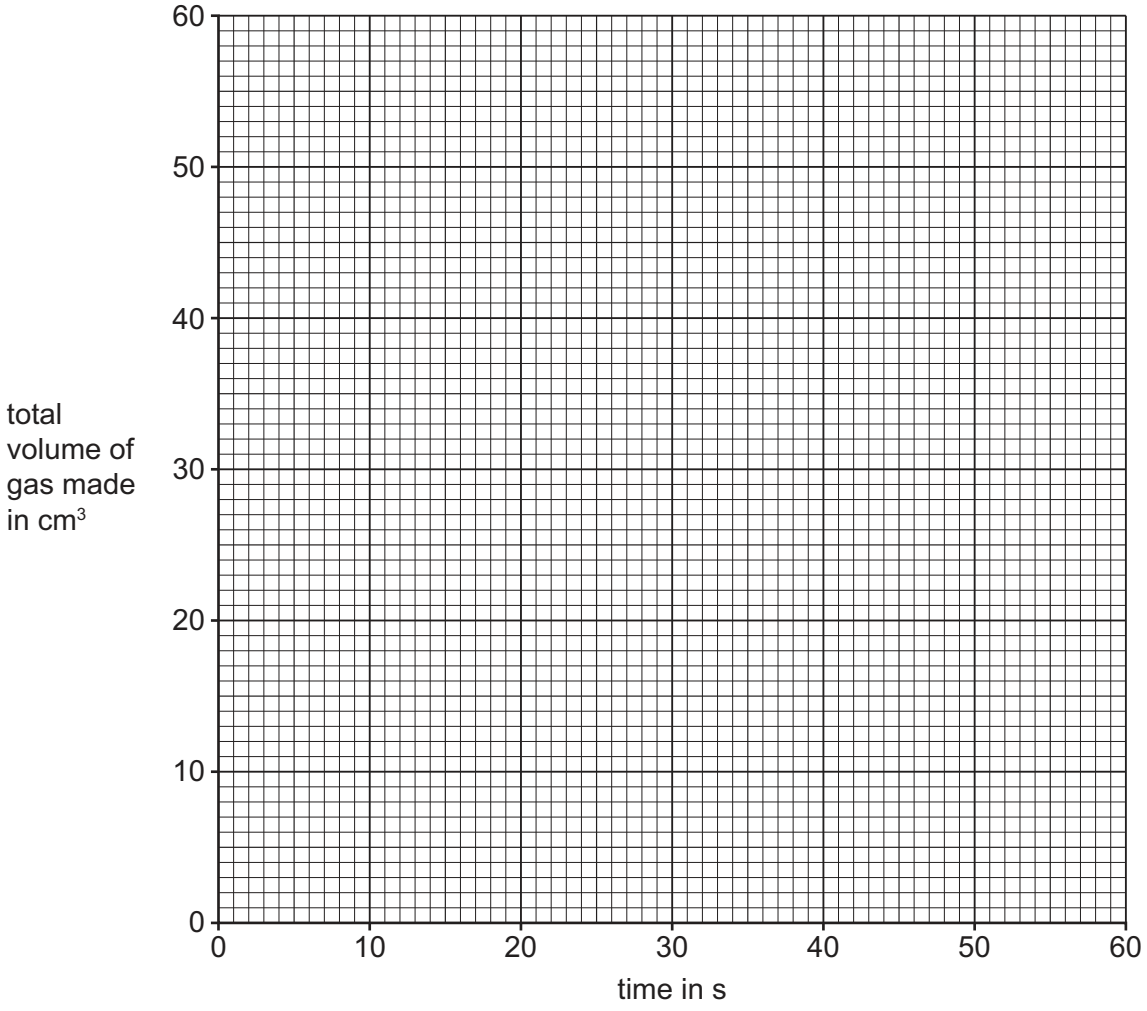
- adds 50 cm^3 of dilute hydrochloric acid to the flask
- then adds 0.5 g of magnesium powder to the flask
- takes readings of the total volume of gas made every 10 s during the reaction.

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.



[2]

(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 = ... cm^3 [1]

(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?

..... [1]

