Cambridge Assessment International Education

Cambridge Lower Secondary Checkpoint

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

9309334159

SCIENCE **0893/02**

Paper 2 **October 2023**

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.

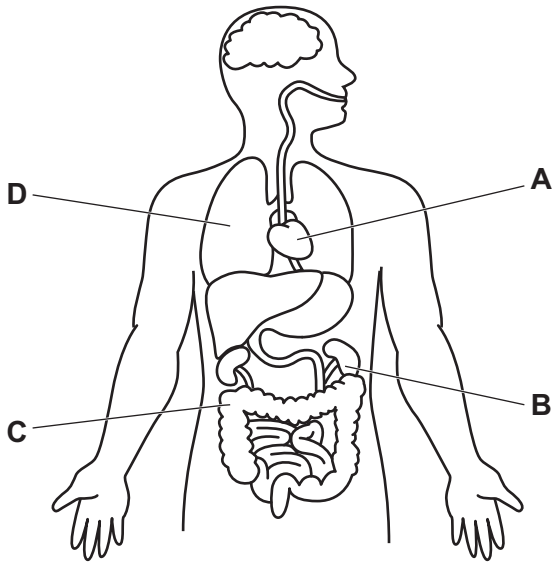
INFORMATION

- 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 **16** pages.

IB23 10_0893_02/9RP

1 The diagram shows the position of some organs in the human body.



(a) Circle the letter of the organ that is part of the human excretory (renal) system.

A **B** **C** **D** [1]

(b) Complete these sentences about the human excretory (renal) system.

The function of the human excretory (renal) system is to filter the blood to remove urea.

The urea is then excreted in a liquid called urine. [2]

(c) Organs are made of cells.

Cells contain chromosomes.

Name the chemical from which chromosomes are made.

DNA [1]

2 Look at the elements in Group 1 from the Periodic Table.

The elements are in the same order as the Periodic Table.

element
lithium
sodium
potassium
rubidium
caesium
francium

(a) Describe how the melting points of the Group 1 elements change down the group.

The melting point decreases [1]

(b) Name the **most** reactive element in Group 1.

Francium [1]

(c) An element in Group 1 reacts with dilute hydrochloric acid.

Circle the gas made in this reaction.

carbon dioxide

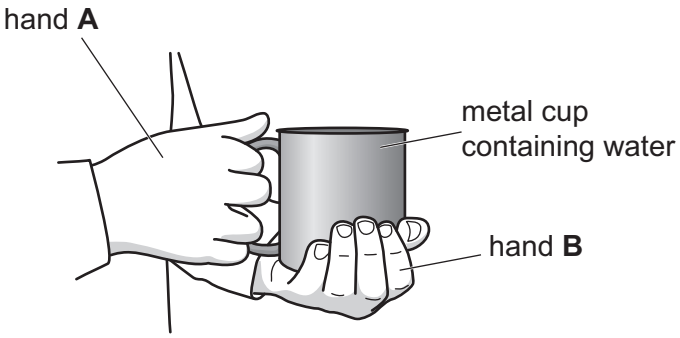
chlorine

hydrogen

oxygen

[1]

3 Mike holds a metal cup containing water.



(a) The water in the metal cup is at a higher temperature than both of his hands.

Describe what happens to the thermal energy in the water.

Thermal energy in the water transfers to the cup and to his hands

[1]

(b) Mike pours the water out of the metal cup.

He adds ice and water to the metal cup.

Describe what Mike feels with hand **B** compared to hand **A**.

He feels colder with hand B compared to hand A

[1]

4 The atoms in a molecule of water are joined together by covalent bonds.

(a) What is a covalent bond?

A pair of electrons is shared between atoms

[2]

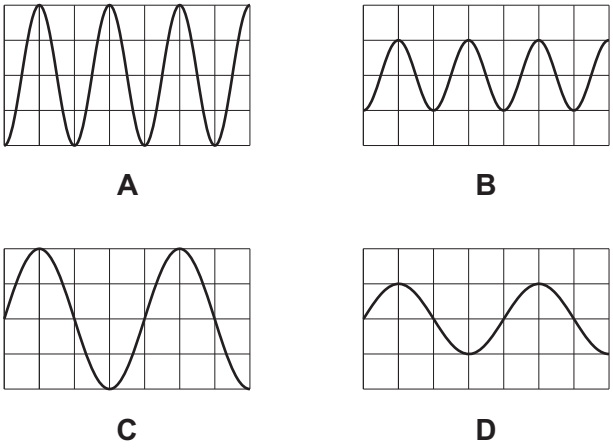
(b) The formula for a molecule of ethane is C_2H_6.

How many atoms are bonded together in one molecule of ethane?

8 [1]

5 Priya compares different sound waveforms.

All the waveforms are drawn to the same scale.



(a) Which **two** waveforms have the **lowest** amplitude?

B and D [1]

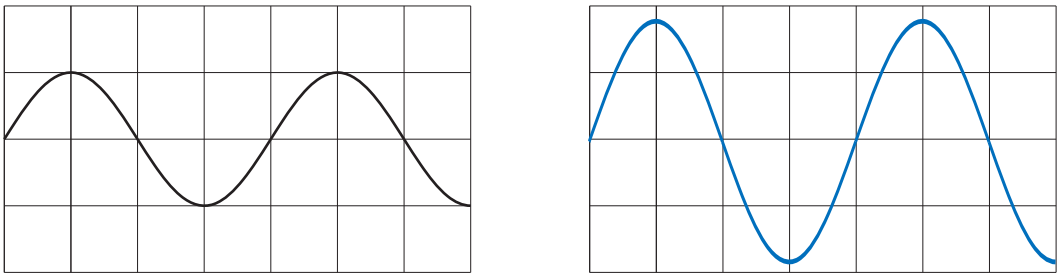
(b) Which **two** waveforms have the **lowest** frequency?

C and D [1]

(c) Which **two** waveforms have the **highest** pitch?

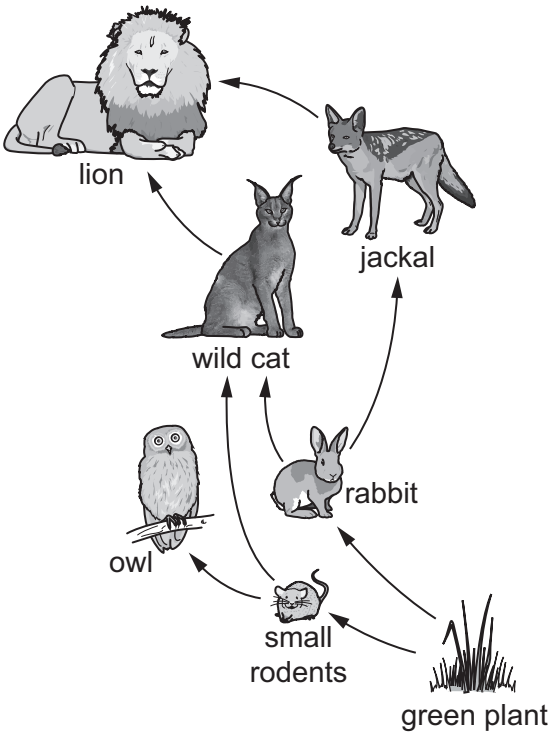
A and B [1]

(d) Draw a waveform on the grid with a **greater** loudness than waveform **E**.



[1]

6 Look at the food web for a habitat.



NOT TO SCALE

(a) A disease decreases the number of small rodents in the habitat.

The number of owls decreases but the number of wild cats stays the same.

Complete the sentences to explain why.

The number of owls decreases because they have fewer rodents to eat .....

.....

The number of wild cats stays the same because they eat more rabbits .....

.....

[2]

(b) Explain why green plants need the Sun to survive.

They need the light from the Sun to photosynthesize and make food .....

.....

..... [3]

7 An object has volume, mass and density.

The object has a volume of 28 cm^3.

The mass of the object is 222 g.

Calculate the density of the object.

density = mass/volume = 222/28

7.9 ..... g/cm^3 [2]

8 The diagram shows part of the Periodic Table.

1 H							2 He
3 Li	4 Be	5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca						

(a) Which element in the table has the lowest number of protons in its atom?

H ..... [1]

(b) Identify **two** elements from the table that are in the same period as the element Mg.

Na ..... and **Al** ..... [1]

(c) Name **one** element from the table that has the same chemical properties as the element Ar.

He ..... [1]

9 Mia is learning about tectonic plates.

She knows that:

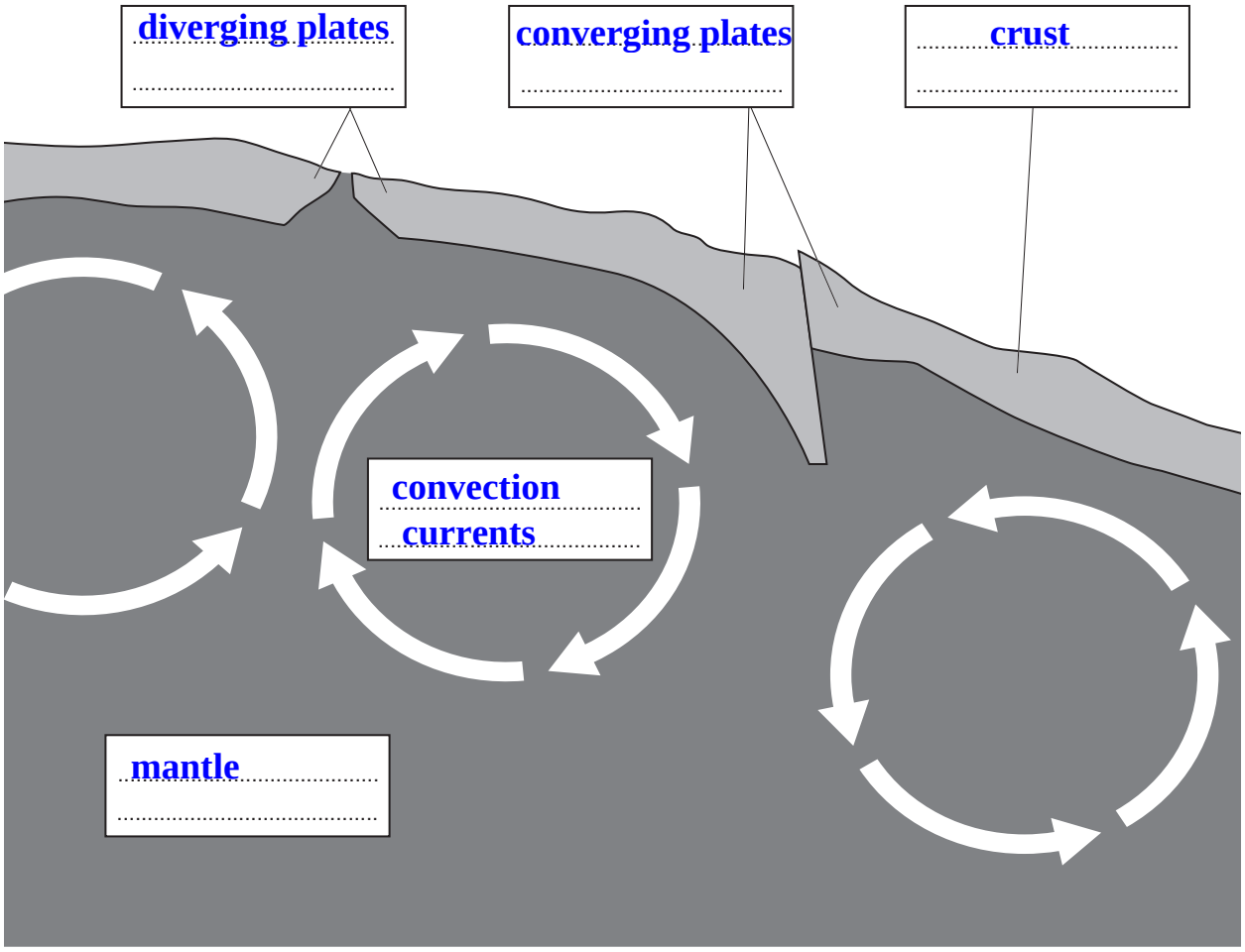
- diverging tectonic plates move away from each other
- converging tectonic plates move towards each other.

(a) Label the diagram.

Choose words from the list.

diverging plates **convection currents** **converging plates**

crust **mantle**



[2]

(b) Mia joins a map of South America to Africa.

Explain why the appearance of the continental coasts is evidence for tectonic plates.

Because the 2 continental coasts fit together like 2 pieces of a puzzle

[2]

(c) Write down **one other** piece of evidence for tectonic plates.

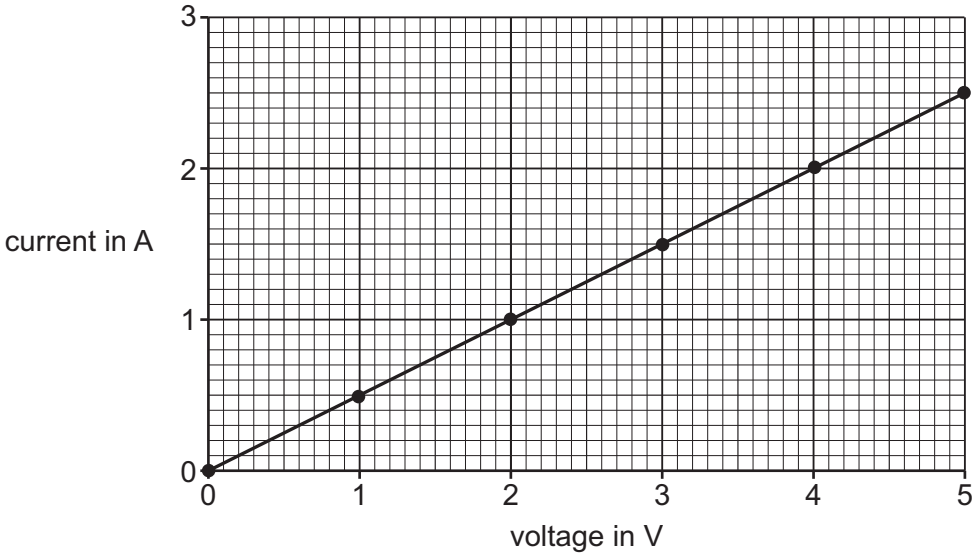
Location of volcanoes

[1]

10 Oliver connects a resistor in an electrical circuit.

He measures the current as he increases the voltage across the resistor.

Oliver draws a graph.



(a) Current is measured in A (amps) and voltage is measured in V (volts).

Write down the unit of resistance.

ohm ..... [1]

(b) Calculate the resistance of the resistor.

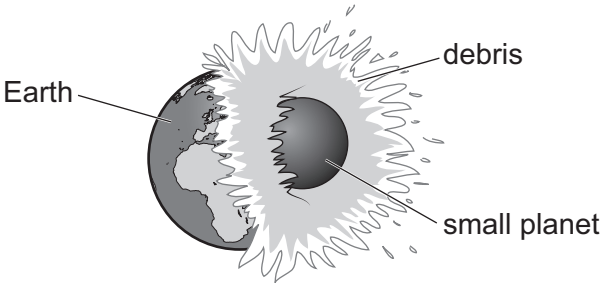
Include the equation used to calculate resistance in your answer.

resistance = voltage/current = 2/1 = 2

resistance = 2 ohm ..... [2]

11 Scientists believe that the Moon was formed after a collision between the Earth and another small planet.

This is called the collision theory for the formation of the Moon.



The debris from the collision collected to form the Moon.

(a) Chen collects information about the elements found on the Earth and on the Moon.

element	percentage of element found on the	
	Earth	Moon
oxygen	45.3	44.7
silicon	22.0	22.5
magnesium	2.6	2.3
iron	6.0	8.3
calcium	3.6	3.1

(i) Most of the information supports the collision theory.

Explain how most of this information supports the collision theory.

The percentage of each element on the Earth is approximately equals to the percentage of each element on the Moon [1]

(ii) There is a comparison of one element that does **not** support the collision theory.

Write down the name of this element.

Iron [1]

(b) Suggest **two other** pieces of evidence Chen collects to support the collision theory.

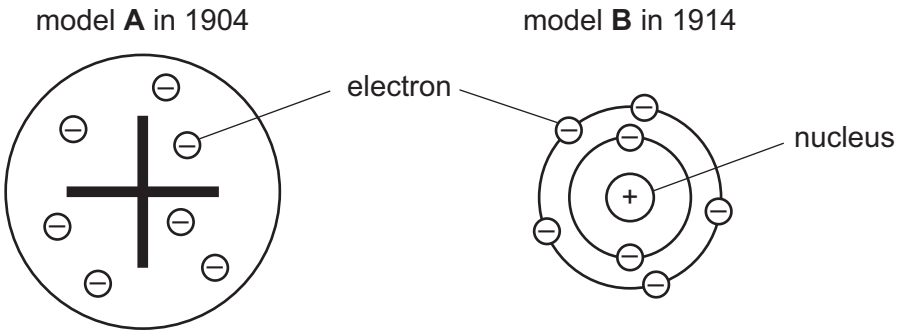
1 Many types of rock found on Earth and Moon

2 There is water on Moon

[2]

12 Theories about the structure of the atom have developed over time.

Look at the models of an atom of nitrogen.



(a) Describe **one similarity** between model **A** and model **B**.

The number of electrons

[1]

(b) Describe **one difference** between model **A** and model **B**.

Model A does not have nucleus

Model B has a nucleus [1]

(c) Model **B** is still used today.

Suggest **one strength** and **one limitation** of using model **B**.

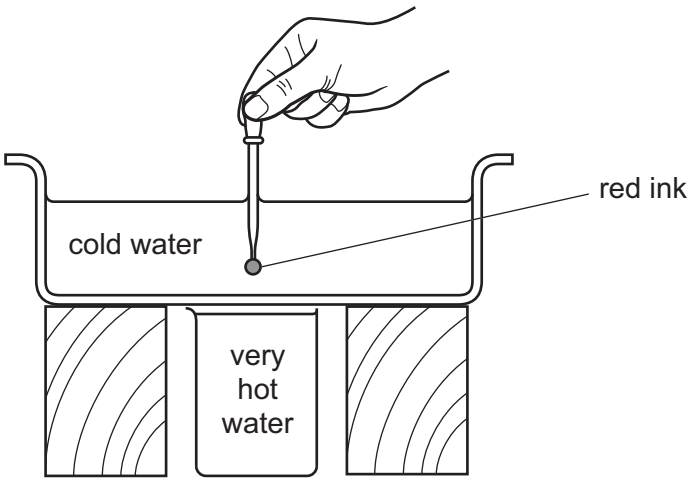
strength It shows negative and positive charges

limitation It does not show the motion of electrons

[2]

13 Yuri investigates convection.

He adds a drop of red ink to the cold water as shown in the diagram.



(a) Complete the sentence to suggest a testable hypothesis for **this** investigation.

I predict that the red ink will move upwards

because there is a current of hot water moving upwards .

[1]

(b) Complete the table about **safety risks** and the **control of risks** in this investigation.

safety risk	control of risk
very hot water may burn skin	wearing protective gloves
red ink may irritate skin	wearing gloves
glass beaker can break and scratch skin	use plastic beaker instead of glass beaker

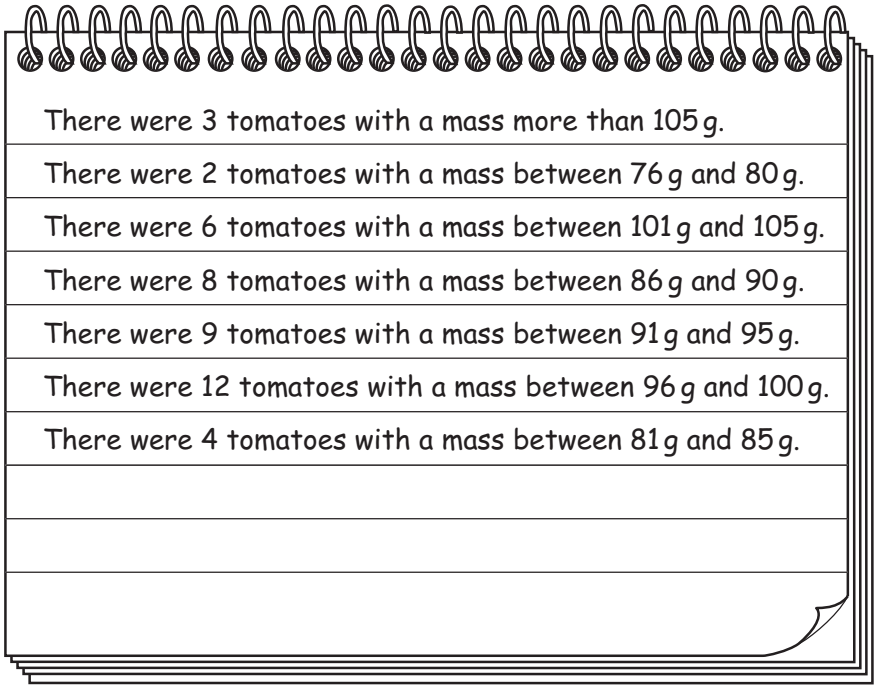
[3]

14 Lily investigates variation in tomatoes.

Lily:

- measures the mass of different tomatoes to the nearest whole gram
- classifies the tomatoes into different groups based on their masses.

Lily writes about her results.



(a) (i) Complete the table of results by writing the:

- unit for the mass range
- number of tomatoes in each mass range.

mass range in g	number of tomatoes in mass range
76 – 80	2
81 – 85	4
86 – 90	8
91 – 95	9
96 – 100	12
101 – 105	6
more than 105	3

[2]

(ii) What is the best way to present the data in the table?

bar graph [1]

(b) Gardeners add nitrates to the soil to help tomato plants grow.

The nitrates are used by the plants to make a substance needed for growth.

Name this type of substance.

protein [1]