Cambridge Assessment International Education

Cambridge Lower Secondary Checkpoint

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

4657240416

SCIENCE **0893/01**

Paper 1 **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.

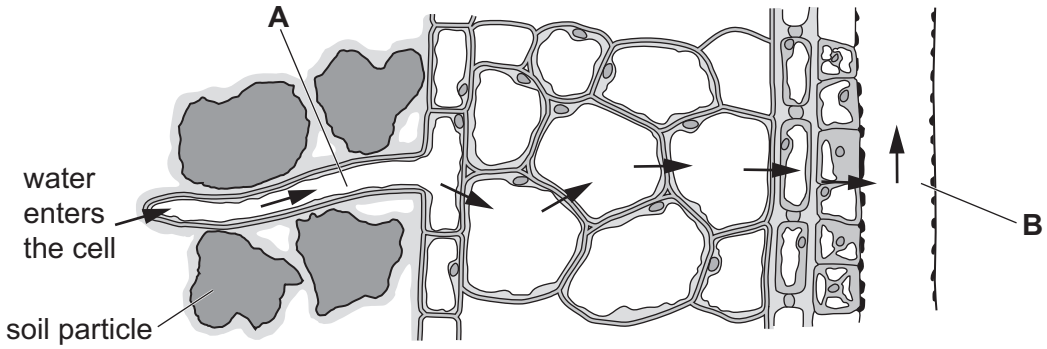
INFORMATION

- 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 **20** pages. Any blank pages are indicated.

B23 10_0893_01/8RP

1 The arrows show the pathway of water through the root.



(a) Name the type of root cell labelled **A**.

Root hair cell [1]

(b) Suggest **one** way root cell **A** is adapted to its function.

Use the diagram to help you.

It has large surface area [1]

(c) Water is transported from the roots to the stem and the leaves through vessel **B**.

Name vessel **B**.

Xylem [1]

(d) Vessel **B** transports minerals to the leaves.

Name the mineral needed to make chlorophyll.

Magnesium [1]

2 Safia has a solution of copper sulfate.

Describe how Safia makes **large** and **dry** copper sulfate crystals from this solution.

Use labelled diagrams to help you with your description.

Heat the solution so there is half of water evaporate

The rest of solution now is more concentrated

Leave the solution to evaporate for several days

What left is large and dry copper sulfate crystals

[3]

3 Heat and temperature are different.

(a) Tick (✓) **all** the correct statements that describe heat.

a measure of how cold something is	
a measure of how hot something is	
a measure of the thermal energy of a substance	✓
measured in MJ	✓
transferred by conduction	✓

[2]

(b) Measurements of temperature in °C can be positive, negative or zero.

Describe how the temperature measurements of water can be positive, negative or zero.

Use ideas about the three states of matter in your answer.

If the temperature of water is positive, water is liquid or gas

If the temperature of water is 0, water is liquid or solid

If the temperature of water is negative, water is solid

[2]

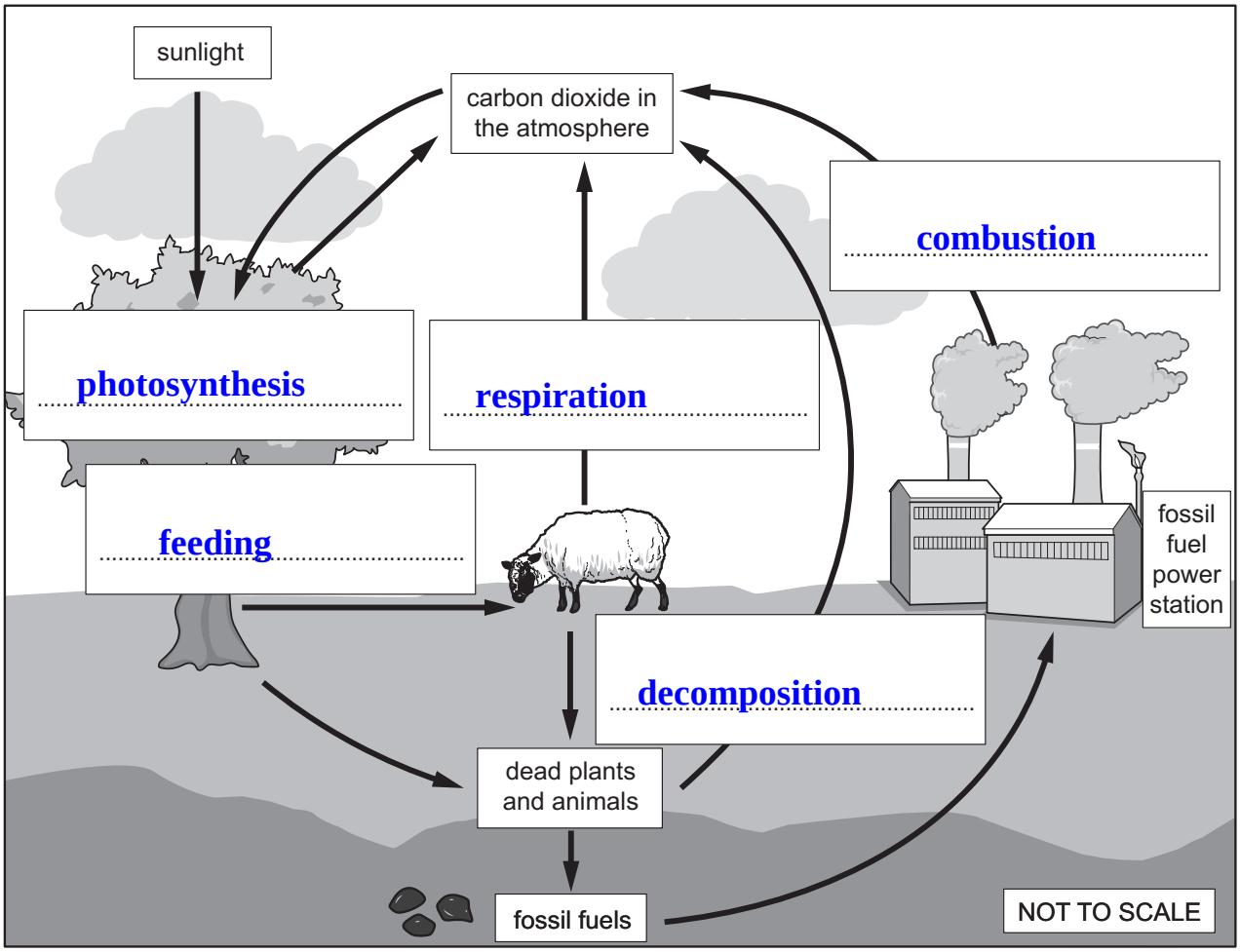
4 This question is about the carbon cycle and climate change.

(a) Complete the carbon cycle diagram.

Choose words from the list.

combustion **decomposition** **feeding**

photosynthesis **respiration**



[3]

(b) Describe what happens during decomposition.

Dead animals and plants are broken down by decomposers to release carbon dioxide to the air [1]

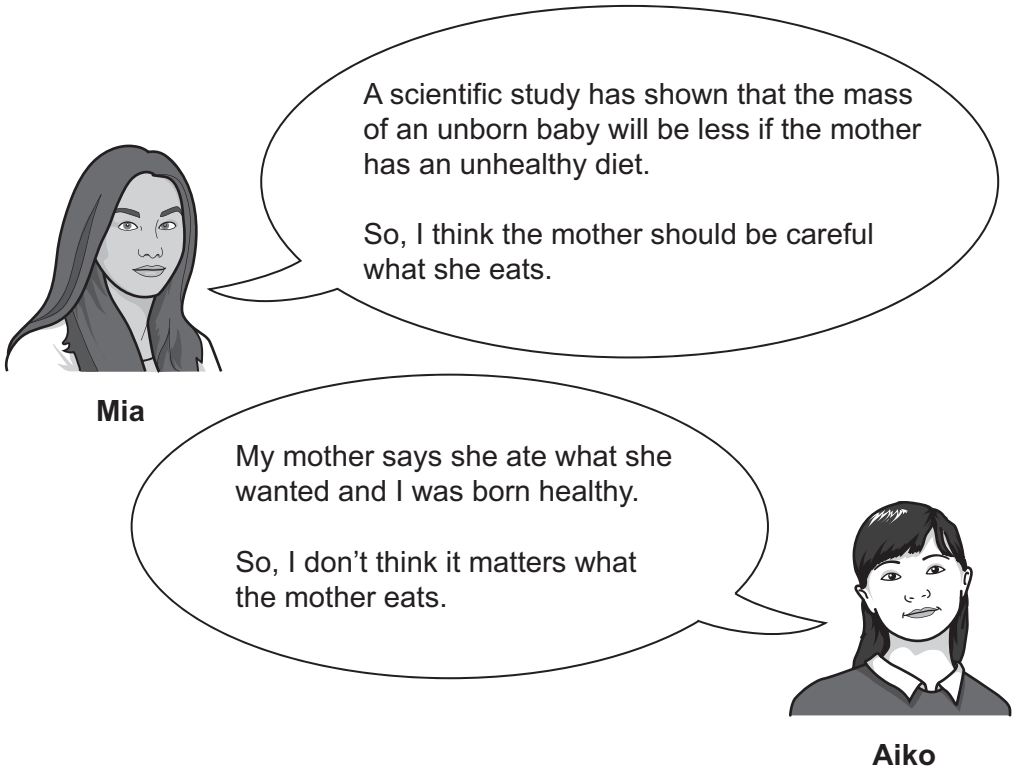
(c) The main cause of climate change is burning fossil fuels.

Describe **one** effect of climate change.

Flooding

[1]

5 Mia and Aiko are discussing ideas about fetal development and the health of the mother.



(a) Who has made a more informed decision?

Tick (✓) **one** box.

Mia ✓ Aiko ☐

Explain your answer.

Mia's idea comes from a scientific study so it is an informed decision

[1]

(b) The diet of the mother is one factor that affects fetal development.

Write down **one other** factor that affects fetal development.

Gene [1]

6 Many scientists believe that a large asteroid collided with the Earth over 65 million years ago.

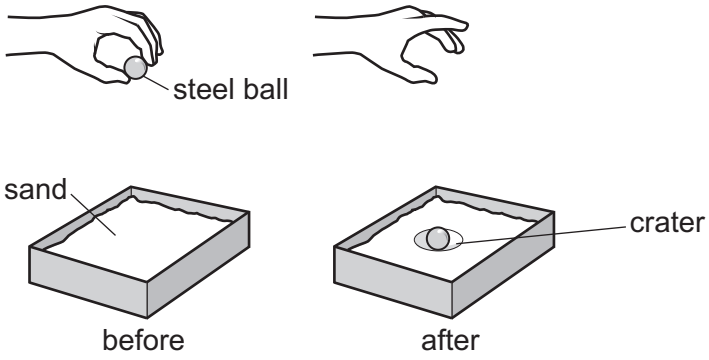
(a) Two effects of this collision were the formation of a crater and climate change.

Write down **one other** possible effect of this collision.

Mass extinction [1]

(b) Carlos models an asteroid colliding with the Earth.

He drops a steel ball into a box containing sand.



(i) Describe what the steel ball and the sand represent in his model.

steel ball asteroid

sand surface of the Earth

[2]

(ii) Suggest **two** ways Carlos increases the width and depth of the crater.

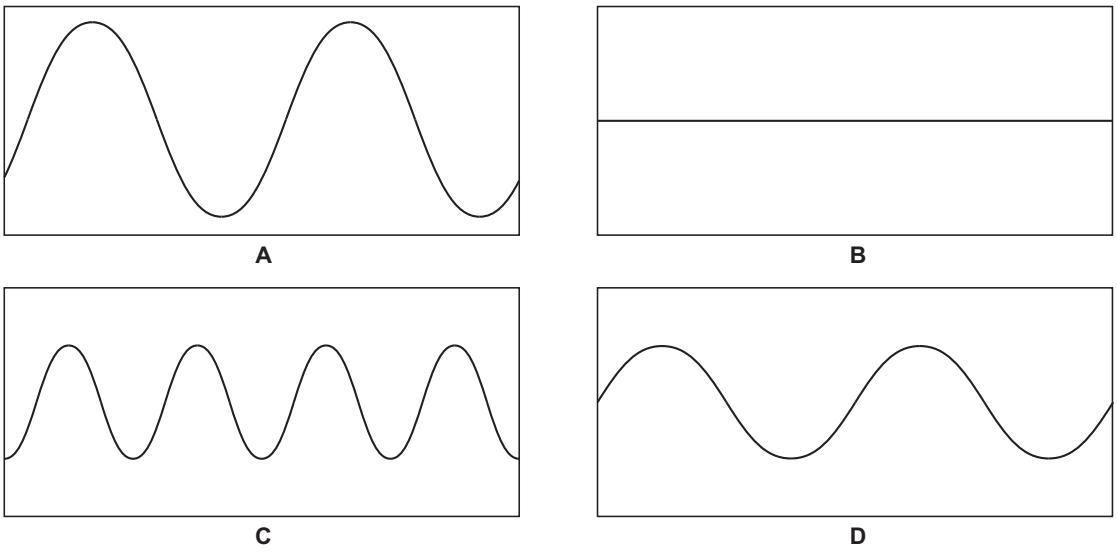
1 Throw the ball with hard force

2 Use the heavier ball

[2]

7 Waveforms show how sound waves interact.

Look at the different waveforms.

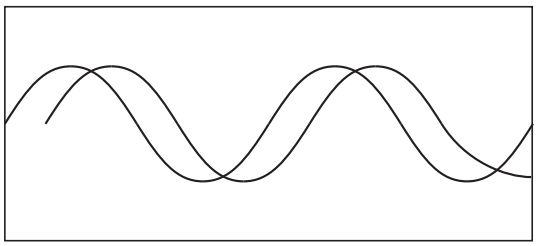


(a) Waveform **B** is the result of the interaction between two waveforms.

Which word describes this interaction?

Cancellation [1]

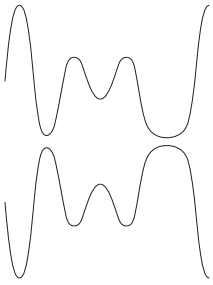
(b) Look at this diagram showing two waveforms.



Which waveform **A**, **B**, **C** or **D** is the result of the interaction between these two waveforms?

A [1]

(c) Look at this diagram showing two waveforms.



Which waveform **A**, **B**, **C** or **D** is the result of the interaction between these two waveforms?

B [1]

8 **(a)** Chen investigates the inheritance of sex in humans.

Chen:

- uses green balls to represent gametes with X chromosomes
- uses yellow balls to represent gametes with Y chromosomes
- puts 25 green balls and 25 yellow balls into bag **A**
- puts 50 green balls into bag **B**
- takes one ball out of each bag and records the colours
- returns the balls to their bags.

Explain why bag **A** represents male gametes.

There are X and Y chromosomes in bag A

[1]

(b) Chen takes balls out of the bags five more times.

(i) Look at the table of his results.

The table is **not** complete.

Complete the table to identify if the two balls (gametes) chosen represent a male or a female offspring.

	colour of ball from bag A	colour of ball from bag B	male or female offspring
1	green	green	female
2	yellow	green	male
3	green	green	female
4	yellow	green	male
5	green	green	female
6	green	green	female

[1]

(ii) The chance of a male and a female producing a male offspring is 50%.

Chen's results do **not** show a value of 50%.

Suggest why.

Because the sample size is not big enough

[1]

9 Sodium is in Group 1 of the Periodic Table.

Sodium reacts with chlorine to form an ionic compound.

This ionic compound contains sodium ions, Na^+, and chloride ions, Cl^-.

Why is a sodium ion positively charged?

Circle the correct answer.

a sodium atom gains a proton

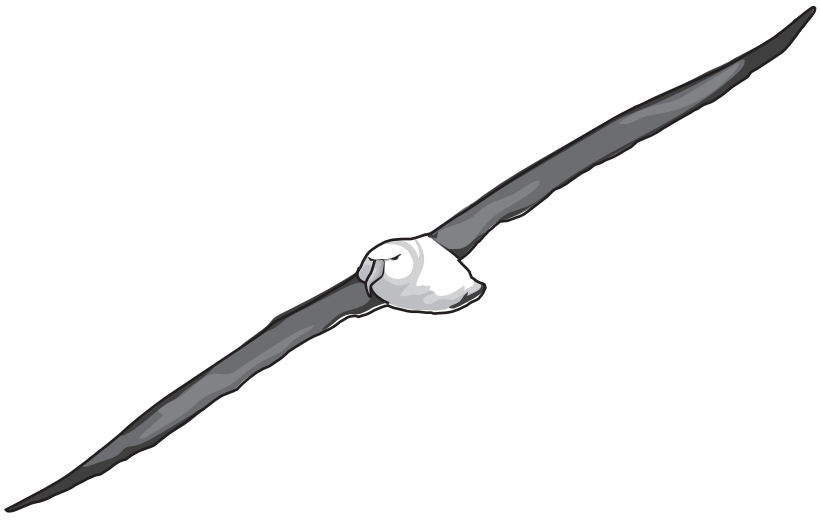
a sodium atom loses a proton

a sodium atom gains an electron

a sodium atom loses an electron

[1]

10 The albatross is a sea bird with very long wings.



(a) The albatross may have long wings due to the process of natural selection.

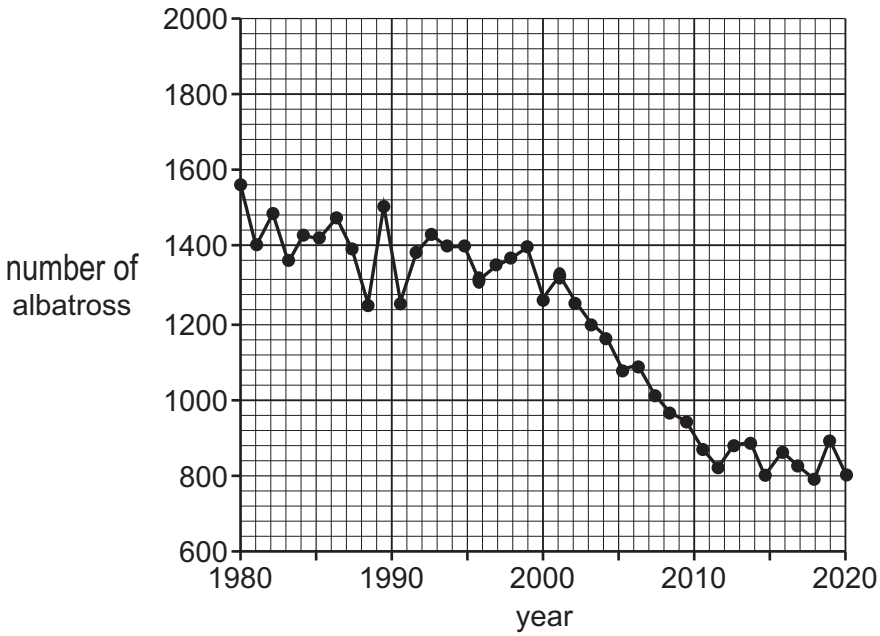
Tick (✓) **all** the boxes that show correct statements about natural selection and the albatross.

The albatross with longer wings pass on their genes to their offspring.	✓
There is **no** variation in the length of albatross wings.	
The albatross do **not** compete for food.	
The length of the wings decreased over many generations.	
The albatross with longer wings are more likely to survive.	✓

[2]

(b) A scientist counts the number of albatross that nest on an island every year.

Look at the results.



Complete these sentences.

Between the years 1980 and 2020, the number of albatross decreased .

One reason for this could be hunting.

If the trend in the graph continues, the albatross species could become extinct .

[3]

11 Rajiv investigates the reaction of zinc, Zn, and dilute sulfuric acid, H_2SO_4.

Hydrogen, H_2, and zinc sulfate, $ZnSO_4$, are made in the reaction.

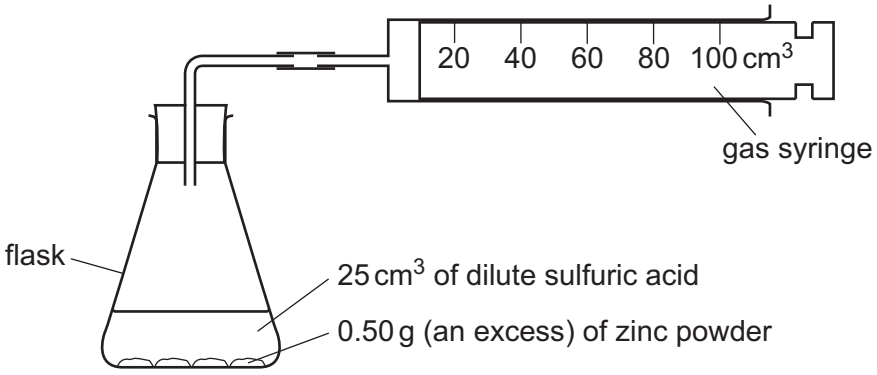
(a) Write the symbol equation for this reaction.

Zn + H2SO4 → H2 + ZnSO4

[2]

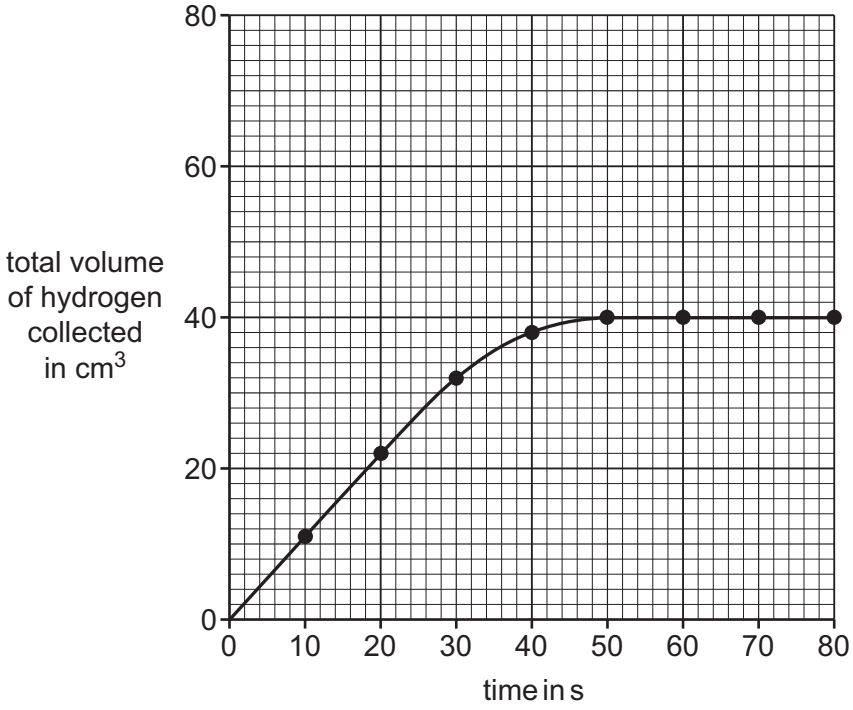
(b) Rajiv:

- puts 25 cm^3 of dilute sulfuric acid into a flask
- adds 0.50 g (an excess) of zinc powder to the sulfuric acid
- assembles the equipment shown in the diagram



- measures the total volume of hydrogen collected in the gas syringe every 10 seconds.

(i) Look at the graph showing his results.



Rajiv repeats the experiment using the same quantities of zinc powder and dilute sulfuric acid.

He uses acid at a **higher** temperature.

He does **not** change any other conditions.

Sketch a line on the graph to show the results of this experiment.

Label the line **H**.

[2]

(ii) Rajiv repeats the experiment a second time using the same quantities of zinc and dilute sulfuric acid.

He uses a lump of zinc instead of zinc powder.

He does **not** change any other conditions.

The rate of the reaction **decreases**.

Explain why.

Use ideas about the particle model.

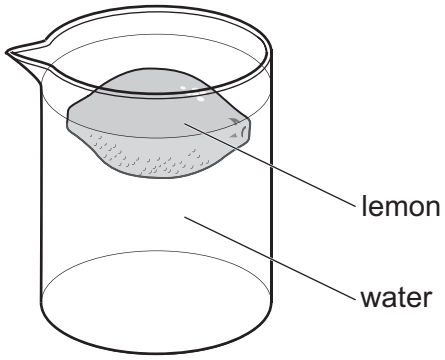
A lump of zinc has less surface area compared to zinc powder.

There is fewer collisions between zinc particles and acid. So the rate of reaction decreases

[2]

12 Blessy investigates floating and sinking.

She puts a whole lemon in a beaker of water.



The whole lemon floats.

Water has a density of 997 kg / m^3.

Whole lemon has a density of 984 kg / m^3.

Look at the table showing the density of different parts of a lemon.

part of lemon	density in kg / m^3
peel	956
segment	998
seed	925

(a) Predict which parts of the lemon float when in water.

The peel and seed of lemon will float in water

Explain your answer.

Because they have less density than water

[1]

(b) Blessy wants to find out if the different parts of a lemon will float or sink in salt solution.

She predicts that as the concentration of salt solution increases eventually all three parts of the lemon will float.

Write a plan for her investigation.

Prepare several beakers containing salt solution with different concentration

Try to put all parts of a lemon into each of the beakers to see if it floats

.....

.....

.....

..... [2]

13 Elements and compounds either have a giant structure or a simple structure.

The table shows information about five substances.

Complete the table to identify if the structure of each substance is giant or simple.

substance	melting point	boiling point	does it conduct electricity	structure (giant or simple)
J	low	low	no	simple
K	high	high	yes	giant
L	low	low	no	simple
M	high	high	no	giant
N	high	high	no	giant

[2]

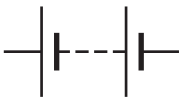
14 Ahmed describes an electrical circuit.

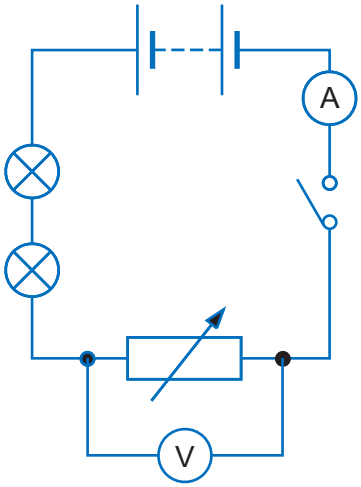
My circuit is a complete series circuit with:

- one battery of cells
- two lamps
- one open switch
- one variable resistor
- one meter to measure the current in the whole circuit
- one meter to measure the voltage across the variable resistor.

Draw his circuit using conventional symbols.

The battery of cells has been drawn for you.





[4]

