Cambridge Lower Secondary Checkpoint

CANDIDATE NAME

SCIENCE **1113/02**

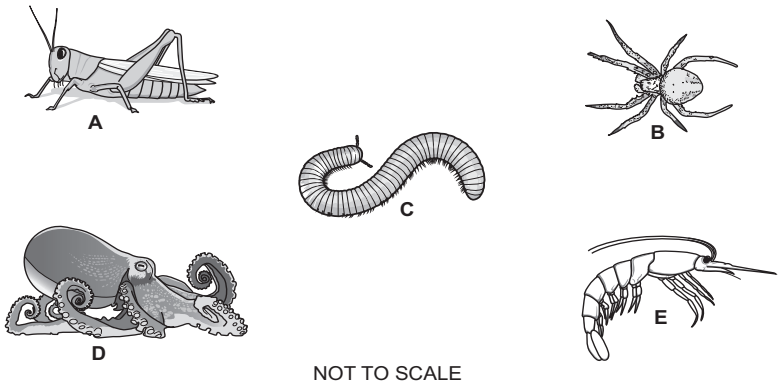
Paper 2 **October 2020**

45 minutes

Candidates answer on the Question Paper.

Additional Materials: Pen, Pencil, Ruler, Calculator

1 The diagrams **A, B, C, D** and **E** show five different invertebrate animals.



NOT TO SCALE

(a) (i) Which one of the animals is an insect?

Choose from **A, B, C, D** or **E.**

A

Give a reason for your answer.

A has 3 pairs of legs, 1 pair of antennae, the body with 3 parts [1]

(ii) Which one of the animals is an arachnid?

Choose from **A, B, C, D** or **E.**

B

Give a reason for your answer.

It has 4 pairs of legs, 2 body parts [1]

(b) Which one of the animals is **not** an arthropod?

Choose from **A, B, C, D** or **E.**

D

Give a reason for your answer.

The body is not segmented, has not jointed legs [1]

2 This question is about the three states of matter.

(a) A gas is blown into a balloon. The balloon changes shape.

Why does the balloon change shape?

Tick (✓) the box next to the **correct** answer.

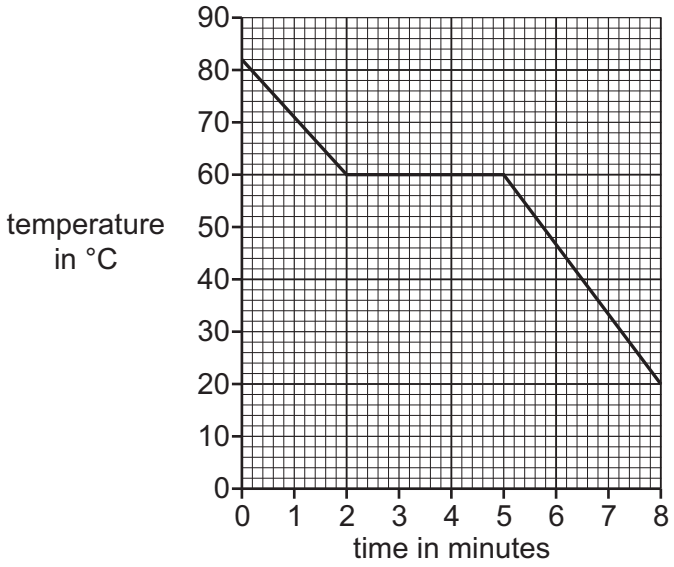
The particles of the gas expand to fill the space.	☐
The particles of the gas get bigger.	☐
The particles of the gas hit the surface of the balloon more often.	☑
The particles of the gas slow down.	☐

[1]

(b) Rajiv investigates the cooling curve of a substance.

He measures the temperature of a hot liquid every minute.

The graph shows his results.



(i) What is the temperature of the hot liquid at the start?

82 °C [1]

(ii) Name the process that happens when a liquid changes into a solid.

freezing [1]

(iii) At what temperature does the liquid change into a solid?

60 °C [1]

3 Complete the sentences about thermal (heat) energy transfer.

Choose words from the list.

conduction **convection** **radiation**

Thermal (heat) energy can be transferred from one place to another place.

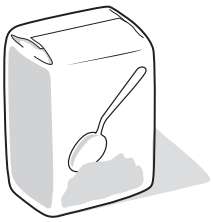
When particles are involved, the processes are conduction and convection.

When electromagnetic waves are involved, the process is radiation.

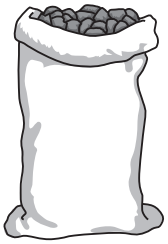
[2]

4 Look at the list of different energy sources.

wood



sugar



coal

crude oil (petroleum)

propane (LPG)

sunflower oil

Which three of these energy sources are **non-renewable**?

1 coal

2 crude oil

3 propane

[1]

5 Complete the sentences about changes that happen in the human body during adolescence.

Choose words or phrases from the list.

at the same time as	**body hair**	**breasts**	**earlier than**
enzymes	**hormones**	**later than**	**proteins**

During adolescence, the human body begins to change.

Both sexes begin to grow ..... body hair ..... .

This is due to the increased amount of ..... hormones ..... made by the sex organs.

On average, females become sexually mature ..... earlier than ..... males.

[3]

6 Chen investigates some reactions.

He measures the temperature of the reactants at the start of the reaction.

He measures the temperature of the products at the end of the reaction.

Look at his results.

reaction	temperature at start in °C	temperature at end in °C	temperature change in °C	type of reaction
A	20	15	−5	endothermic
B	20	30	10	exothermic
C	15	30	15	exothermic
D	25	15	-10	endothermic

(a) Complete the table. [2]

(b) Which reaction has the **greatest** energy change?

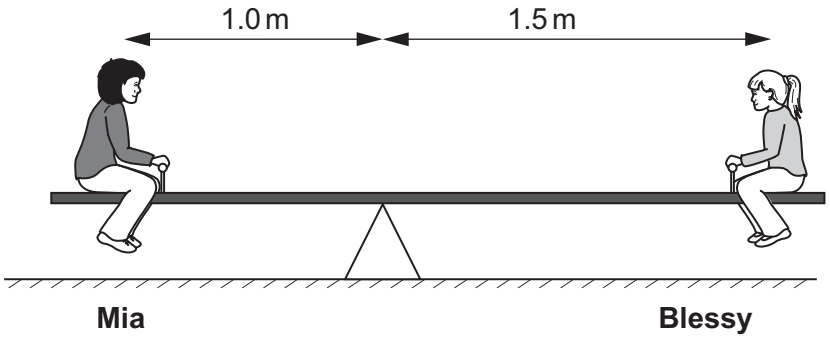
..... C .....

Explain how you know.

..... C has the largest temperature change, which is 15 °C .....

[2]

7 Mia and Blessy sit on a balanced seesaw.



Blessy has a weight of 400 N.

Calculate the weight of Mia.

W x 1 = 400 x 1.5

W = 600 N

weight of Mia **600** N [2]

8 Some plants live in dry places where there is very little rainfall.

(a) These plants often have a large network of roots.

Describe **two** different functions of roots.

1 **Taking in water and minerals**

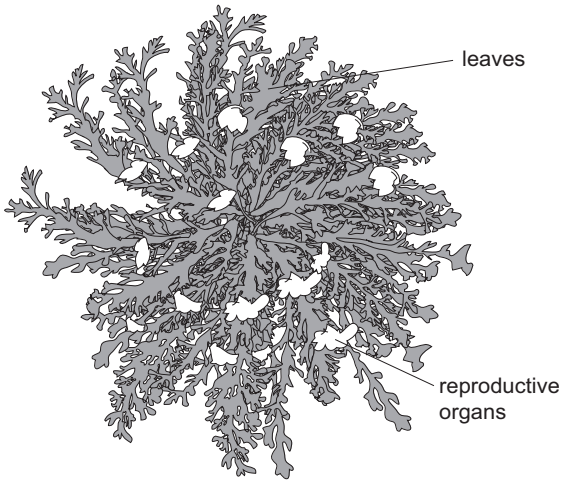
2 **Make anchorage for the plants**

[2]

(b) When it is dry, resurrection plants are rolled up.

In wet conditions, resurrection plants unroll and flatten out.

This exposes the plant's leaves and reproductive organs.



Explain why these changes are important to the resurrection plant's survival.

(i) Unrolling to expose its leaves.

Maximize the ability of absorbing sunlight

➡ Maximize the food made by photosynthesis

[2]

(ii) Unrolling to expose its reproductive organs.

Make the process of pollination and fertilisation easier

➡ More seeds will be produced [2]

9 Lily investigates the boiling points of some liquids.

(a) She uses a Bunsen burner to heat 20 cm^3 of each liquid in a beaker.

Which equipment should Lily use to measure the boiling point of the liquid?

Thermometer [1]

(b) Write down **one** safety precaution that Lily should take.

Wearing goggles [1]

10 Mike explains that different materials have different densities.

He says,

'Materials that are less dense than water will float.

Water has a density of 1 g / cm^3.'

He finds out the densities of different materials.

material	density in g / cm^3
gold	19.3
plastic	1.05
pumice stone	0.251
silver	10.5
wood	0.715

(a) Predict which **two** materials will float.

Choose from the table.

pumice stone and wood [1]

(b) Mike collects some water from the sea.

He tries to float the materials from the table in the seawater.

Now **three** of these materials float.

Use information from the table to explain why.

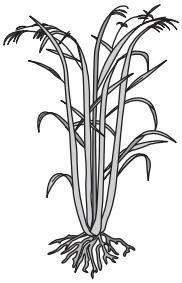
Sea water has more density than pure water

Three of materials that float are: pumice stone, wood and plastic

[2]

11 The seeds of cereal plants provide food for humans.

The diagram shows five varieties of a cereal plant.

A	B	C
		
produces lots of seeds	small leaves	does not need much water

D	E
	
long stems	shallow roots

Scientists want to produce a new variety of this cereal plant.

This cereal plant must:

- provide lots of food
- survive in dry conditions.

(a) Which **two** plants should the scientists use to produce the new variety of cereal plant?

Choose from **A**, **B**, **C**, **D**, and **E**.

A and C [1]

(b) Describe what the scientists do to produce the new variety.

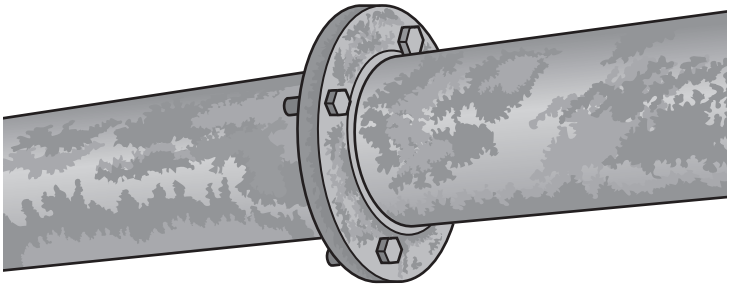
Breed the plant A and C. Choose the offsprings that have the desired properties. Repeat the process many times

[2]

(c) Name the process scientists use to produce new varieties of plants and animals.

Selective breeding [1]

12 Look at the picture of an iron pipe.



The iron has reacted with water and a gas in the air to form hydrated iron oxide.

(a) What word describes this reaction?

Rusting [1]

(b) Which gas in the air reacts with the iron?

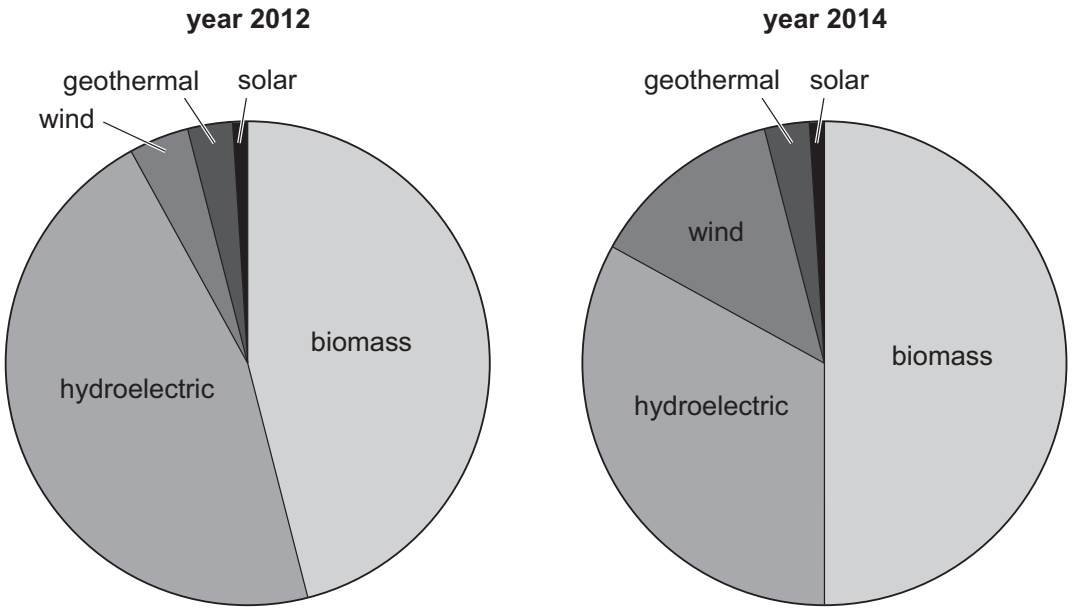
oxygen [1]

(c) This reaction is **not** useful.

Explain why.

Rusting can damage the pipe [1]

13 Safia finds information about renewable energy resources used in a country for the years 2012 and 2014.



(a) Estimate the percentage of renewable energy provided by biomass in 2012.

45 % [1]

(b) The percentage of the renewable energy resources used changed from 2012 to 2014.

Which percentage increased the most?

Circle the correct answer.

biomass

geothermal

hydroelectric

solar

wind

[1]

(c) The energy needs of the world are increasing.

Why is it important to develop **renewable** energy resources?

Because non-renewable energy resourses will run out sooner or later

[1]

14 Look at the diagram.

It shows part of the Periodic Table.

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

(a) Write down the chemical symbol of an element in the same **group** as chlorine.

F [1]

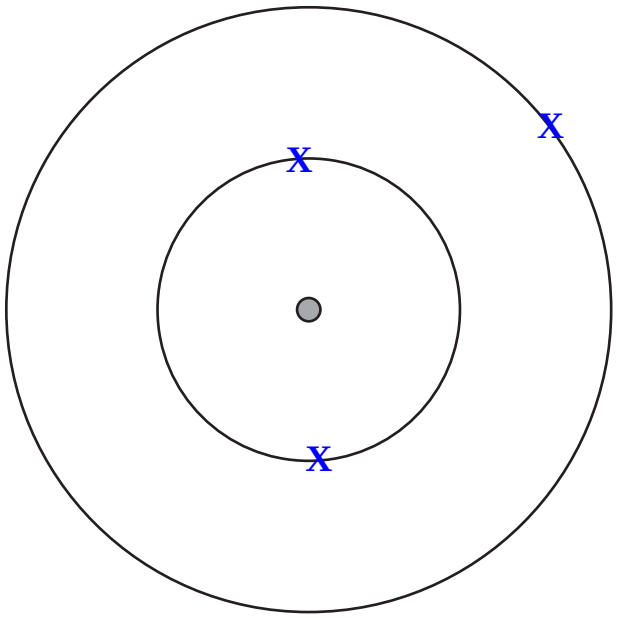
(b) Write down the chemical symbol of an element in the same **period** as sodium.

Mg [1]

(c) Write down the chemical symbol of the element with an atom with only 8 protons.

O [1]

(d) Complete the diagram to show the electronic structure of lithium, Li.

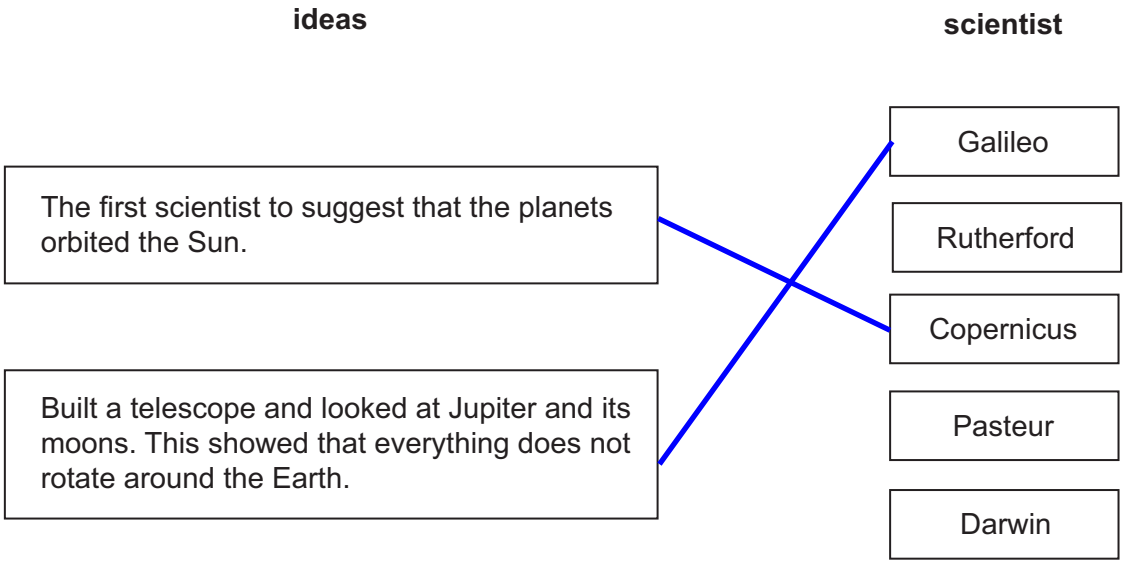


[1]

15 The boxes show some ideas about the Solar System.

(a) Match each **idea** to the correct **scientist**.

Draw only **two** lines.



[2]

(b) Here is a list of bodies found in the Solar System.

Earth **Mars** **Moon** **Sun**

Which one of these bodies is visible because it **emits** light?

Sun [1]

(c) Which **two** of these bodies are visible because they **reflect** light?

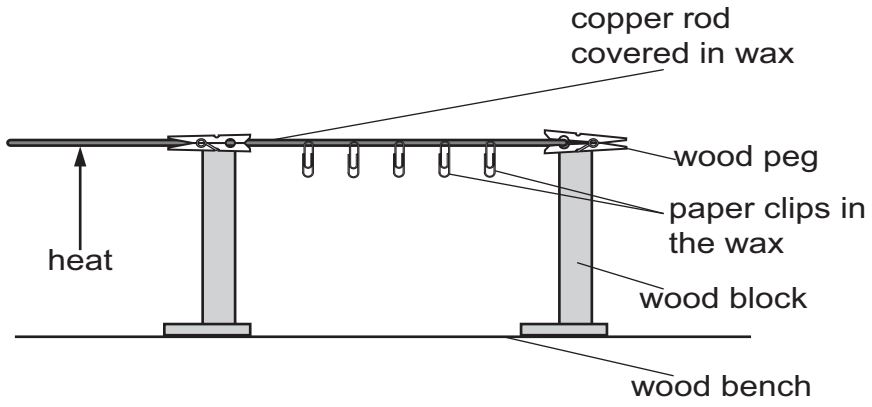
Mars **Moon** **North Star** **Sun**

Mars and Moon [1]

16 Aiko and Oliver investigate thermal (heat) energy.

They heat a copper rod covered in wax.

Here is the apparatus they use.



When the copper rod is hot, the wax melts and the paper clips fall onto the bench.

(a) Aiko removes the copper rod. Oliver tells her to be careful.

Complete the sentences.

Aiko must be careful because the copper rod is hot .

When she removes the copper rod, she uses tongs .

[1]

(b) Here are the results.

distance of paper clip from heat in cm	time for paper clip to fall in seconds
6	3.2
7	4.3
8	5.4
9	6.6
10	7.9

Aiko says it is a good idea to repeat the experiment.

Explain why this is a good idea.

Repeating the experiment will give more reliable results

[1]