Cambridge Lower Secondary Sample Test

For use with curriculum published in September 2020

Science Paper 1

Stage 8

45 minutes

Name .....

No additional materials are needed.

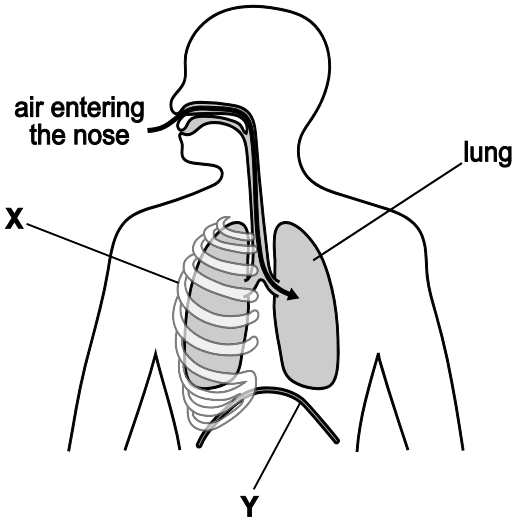
INSTRUCTIONS

- Answer **all** questions.
- Write your answer to each question in the space provided.
- You should show all your working on the question paper.

INFORMATION

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

1 The diagram shows part of the human respiratory system.



(a) (i) The structures labelled **X** and **Y** change the volume of the lungs during breathing.

Name the structures **X** and **Y**.

X is .....

Y is .....

[2]

(ii) Describe how structures **X** and **Y** move to **increase** the volume of the lungs.

.....

.....

..... [2]

(b) Mike and Rajiv plan an investigation to find out how running speed affects breathing rate.

(i) Name the equipment they must use to measure their breathing rate.

..... [1]

(ii) State one variable they need to **change**.

..... [1]

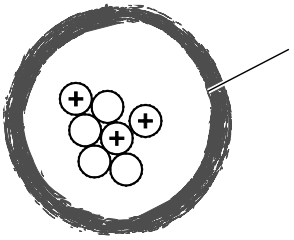
(iii) State one variable they need to keep the **same**.

..... [1]

(iv) Suggest one way they record and present their results.

..... [1]

2 Aiko draws a diagram of an atom of lithium.



NOT TO SCALE

(a) The electrons in the charge cloud are held in position.

They do **not** escape from the atom.

Explain why the electrons in the charge cloud cannot escape from the atom.

Use ideas about the charges on the particles in the atom.

.....

.....

..... [2]

(b) Aiko wants to draw a diagram of an atom of **sodium**.

Describe two ways an atom of sodium is **different** from an atom of lithium.

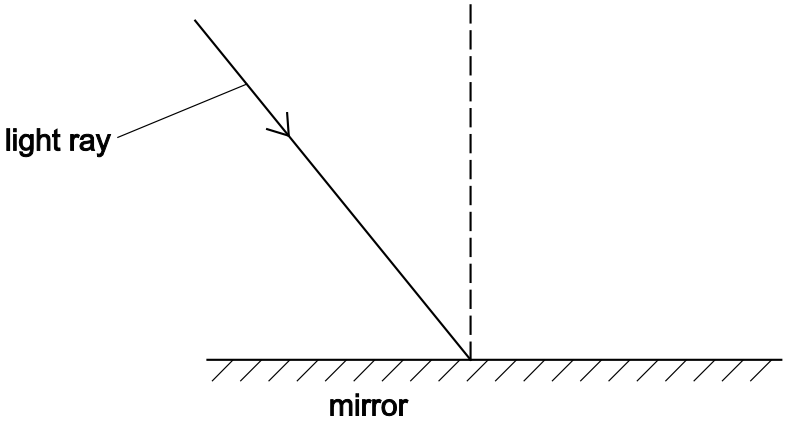
1 .....

2 .....

[2]

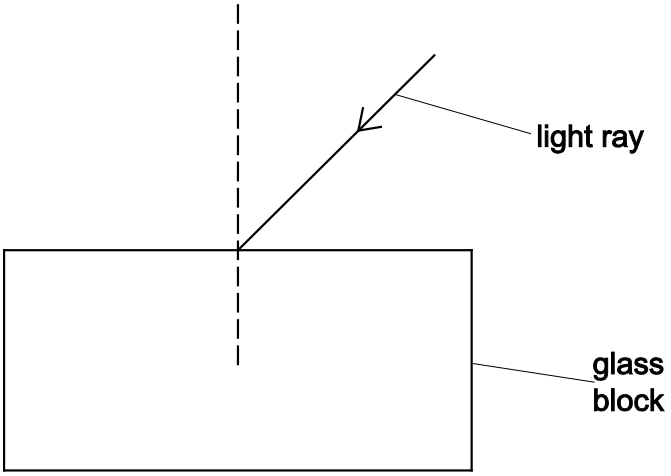
3 Carlos investigates what happens when light hits a mirror and when light hits a glass block.

(a) **(i)** Complete the diagram to show what happens to a light ray that hits the surface of a mirror.



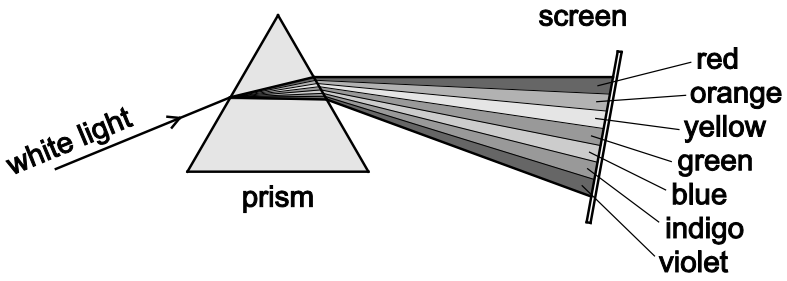
[1]

(ii) Complete the diagram to show what happens to a light ray that hits and then goes through a glass block.



[2]

(b) When white light goes through a prism, the light is refracted and split into the colours of the rainbow.



What is the name of this process?

..... [1]

4 Here is some information about a loaf of bread.

component	amount per 100 g of bread
energy	970 kJ
protein	8.0 g
carbohydrate	51 g
fat	1.7 g
dietary fibre	3.5 g
salt	1.4 g

(a) Why does the body need a supply of protein?

.....

[1]

(b) The total mass of protein, carbohydrate, fat, dietary fibre and salt in the table does **not** add up to 100 g.

What substance makes up the remaining mass of bread?

.....

[1]

(c) **(i)** Calculate the amount of energy provided by 20 g of bread.

..... kJ [1]

(ii) Which component in the bread provides most of this energy?

.....

[1]

(d) Rajiv eats 50 g of bread.

This provides 5% of his recommended daily amount (RDA) of protein.

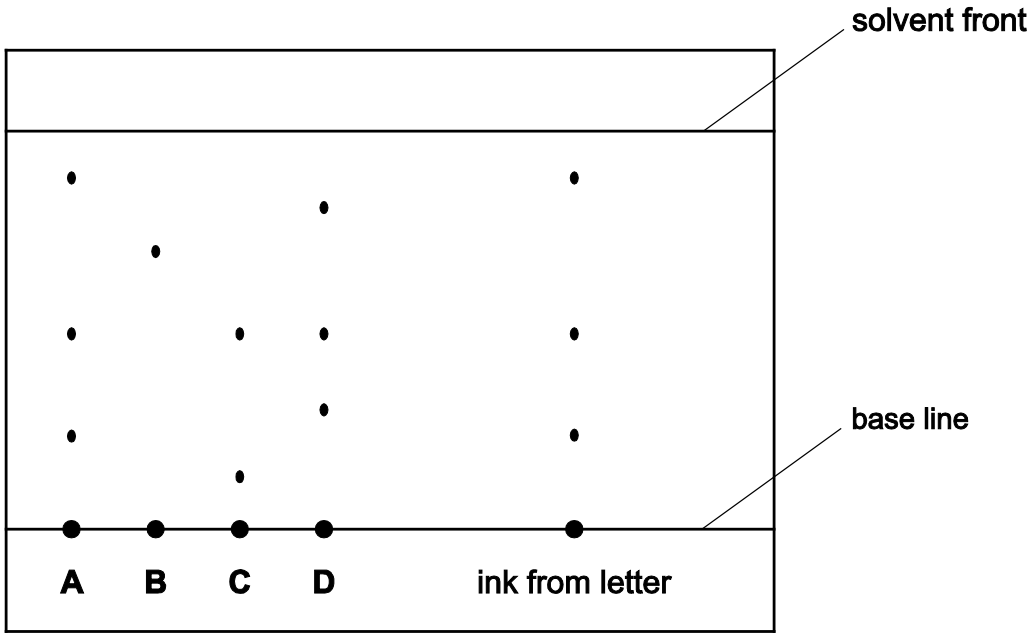
What is Rajiv's RDA of protein?

..... g [2]

5 Lily investigates the ink on a letter.

She uses paper chromatography to separate the dyes in some inks.

Look at the results of Lily's experiment.



(a) Describe how paper chromatography separates the dyes in ink.

.....

..... [1]

(b) Which ink was used to write the letter?

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

.....

Explain how you can tell.

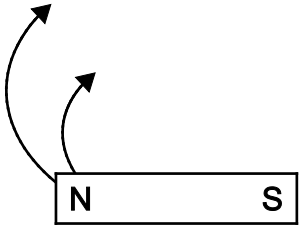
.....

.....

..... [2]

6 This question is about magnets.

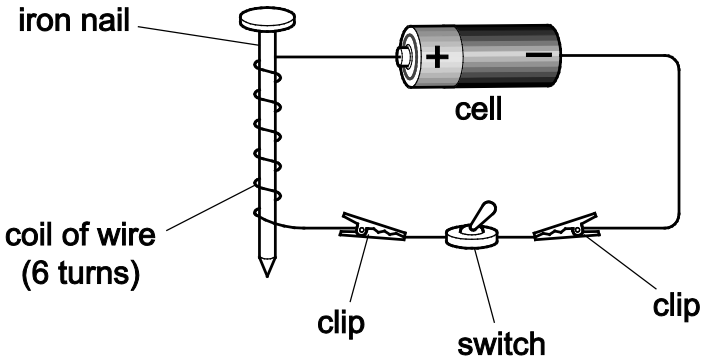
(a) On the diagram of the bar magnet, complete the **two** magnetic field lines shown.



[1]

(b) Jamila makes an electromagnet.

Look at the diagram for her electromagnet.



The electromagnet attracts steel paperclips.

Jamila wants to make her electromagnet **stronger**.

Write down **two** ways she can make her electromagnet stronger.

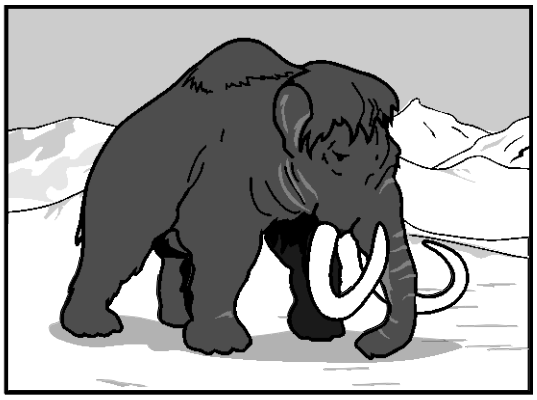
1 .....

2 .....

[2]

7 The drawings, based on fossils, show an iguanodon and a woolly mammoth.

Iguanodon lived
120 million years ago



Woolly mammoth lived
4000 years ago

These animals **both** lived in the **same** parts of Europe but at **different** times.

Both animals are now extinct.

Scientists think that the Earth's climate cycles between warm and cold periods of time.

(a) Does the fossil evidence support the idea that the Earth has cycles of warm and cold periods of time?

.....

Give **two** reasons for your answer.

1 .....

.....

2 .....

.....

[2]

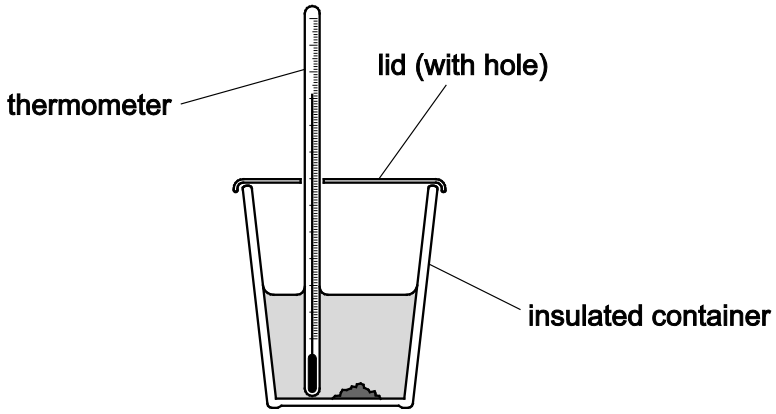
(b) Explain if the fossil evidence supports the idea that each cycle takes a long period of time.

.....

.....

..... [1]

8 Ahmed investigates the energy changes when some chemicals are mixed.



He measures the temperature at the start and at the end of each reaction.

Look at his results.

mixture	temperature at start in °C	temperature at end in °C	type of reaction
A	18	26	exothermic
B	18	18	
C	18	10	

(a) The reaction in mixture **A** is **exothermic**.

Explain how you can tell.

.....

[1]

(b) What **type** of reaction is reaction **C**?

.....

[1]

(c) Mixture **B** involves substances that are **unreactive**.

What word describes substances that are unreactive?

Circle the correct answer.

metals **non-metals** **inert** **explosive**

[1]

9 Yuri runs a 100 m race.

He takes 13 seconds to run 100 m.

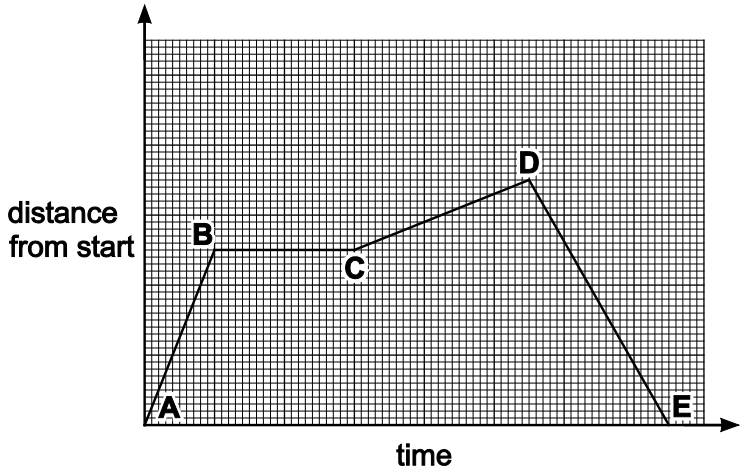
(a) Calculate Yuri's average speed.

Include the units in your answer.

Yuri's average speed = ... [2]

(b) Yuri does a run.

Look at the distance / time graph for Yuri's run.



Yuri stops for a rest.

Between which points does Yuri stop for a rest?

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

A and **B** ☐

B and **C** ☐

C and **D** ☐

D and **E** ☐

[1]

10 Read the information about the Solar System.

- Earth is one of the eight major planets in the Solar System.
- Before 1554 the only known planets were Mercury, Venus, Mars, Jupiter and Saturn.
- In 1608 the first simple telescope was invented by Lippershey.
- In 1781 Uranus was discovered by Herschel.
- In 1801 Piazzi discovered the first asteroid.
- Some time later a ring of asteroids was discovered in orbit between Mars and Jupiter. This is called the asteroid belt.
- Asteroids vary in size and shape.
- In 1846 Neptune was discovered by Galle.

Use the information to help you to answer the questions.

(a) Suggest why astronomers did **not** discover the asteroid belt until the early 1800s.

.....

..... [1]

(b) Circle the name of the scientist who discovered the first asteroid.

Galle **Herschel** **Lippershey** **Piazzi**

[1]

(c) **(i)** What are asteroids made of?

..... [1]

(ii) Why are asteroids **not** classified as planets?

..... [1]

(d) Modern telescopes have a much larger magnification than the first telescopes.

Suggest **two** ways modern telescopes help to improve our knowledge of asteroids and the asteroid belt.

1 .....

.....

2 .....

..... [2]

11 Chemical formulae are used to model chemical compounds.

The chemical formula for glucose is $C_6H_{12}O_6$.

A molecule of glucose contains:

- 6 atoms of carbon, C
- 12 atoms of hydrogen, H
- 6 atoms of oxygen, O.

A molecule of sulfuric acid contains:

- 2 atoms of hydrogen, H
- 1 atom of sulfur, S
- 4 atoms of oxygen, O.

(a) Write the chemical formula for sulfuric acid.

formula ..... [1]

(b) The concentration of a solution of glucose depends on how many glucose particles are present in 1 cm^3 of water.

An **analogy** for concentration is how many children are in a room.

(i) What is meant by an analogy?

.....

..... [1]

(ii) Describe how the analogy of children in a room can be used to model a high concentration solution and a low concentration solution.

high concentration .....

.....

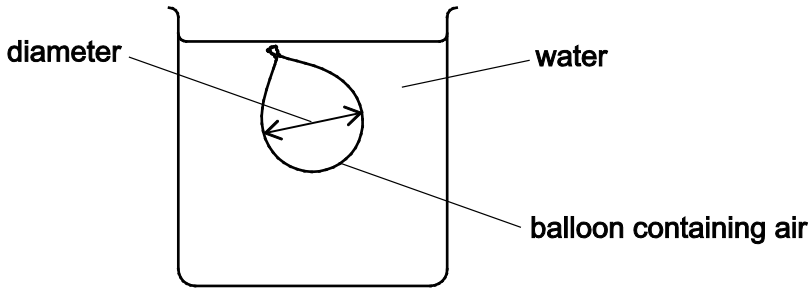
low concentration .....

.....

[2]

12 Safia investigates how changing the temperature affects the volume of a gas.

She places a sealed balloon in water at two different temperatures.



She uses water at 10 °C and at 50 °C.

She measures the diameter of the balloon at both temperatures.

Predict what happens to the diameter of the balloon as the temperature of the water increases.

Prediction .....

.....

Explain your answer. Use ideas about particles.

.....

.....

.....

[3]

“It is not how smart or strong you are, but **how much better** you are today than you were yesterday.”

Mr. Khánh