Cambridge Assessment International Education

Science

Stage 8

Paper 2

2022

Cambridge Lower Secondary Progression Test

Name

Class

Date

45 minutes

No additional materials are needed.

INSTRUCTIONS

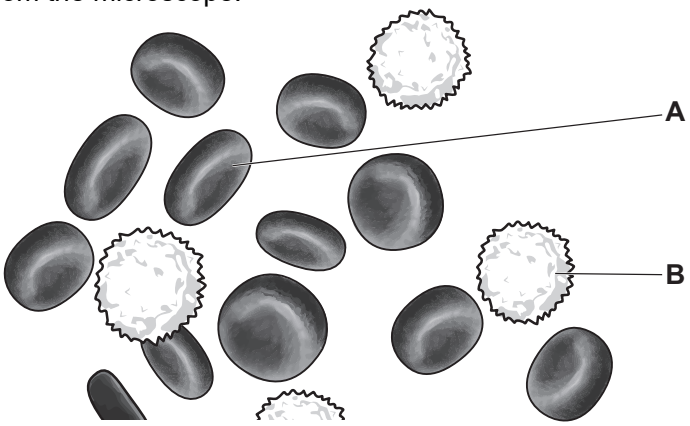
- Answer **all** questions.
- Write your answer to each question in the space provided.
- You should show all your working on the question paper.

INFORMATION

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

1 Safia uses a microscope to study a sample of blood from a healthy person.

Look at the view from the microscope.



(a) Write down the function of cell **A**.

.....

..... [1]

(b) Safia then studies a blood sample from someone recovering from an infection.

This blood sample looks different to the sample from a healthy person.

Describe how the blood sample from a person recovering from an infection looks different.

.....

.....

Explain your answer.

.....

.....

[2]

(c) Blood cells are transported in a liquid.

(i) Write down the name of this liquid.

..... [1]

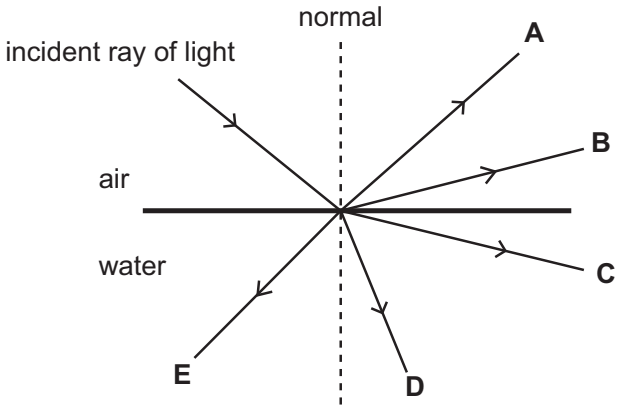
(ii) Write down **one other** function of this liquid.

.....

..... [1]

2 Light is reflected and refracted by water.

The diagram shows some paths a ray of light may take.



(a) Which letter shows the **reflected** ray?

Circle the correct answer.

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

(b) The law of reflection is about the angle of incidence (*i*) and the angle of reflection (*r*).

Write down the law of reflection.

.....

..... [1]

(c) Which letter shows the **refracted** ray of light?

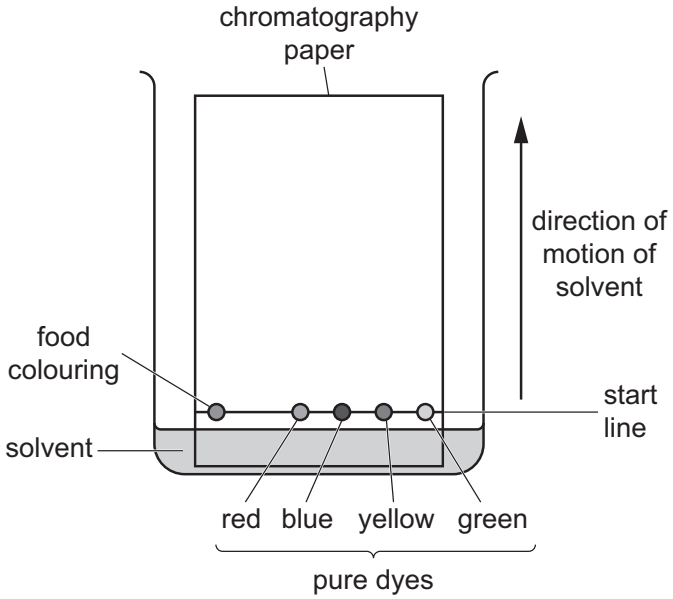
Circle the correct answer.

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

3 Mike investigates the coloured dyes used to make a food colouring.

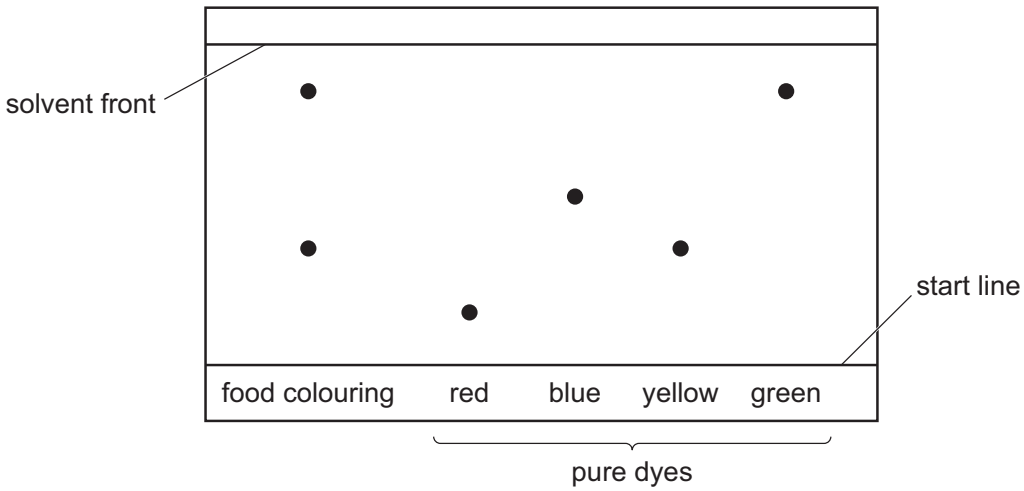
He:

- uses paper chromatography
- draws a start line in pencil on the chromatography paper
- places a dot of food colouring on the start line
- places dots of pure dyes on the start line
- puts the chromatography paper in the solvent as shown in the diagram



- waits until the solvent has soaked up the chromatography paper.

Look at Mike's chromatogram.



(a) Mike puts his food colouring and the pure dyes on a **pencil line** rather than a line drawn in ink.

Explain why.

.....

..... [1]

(b) Paper chromatography separates the colours in the food colouring.

Describe how.

.....

..... [1]

(c) Which coloured dyes are present in the food colouring?

.....

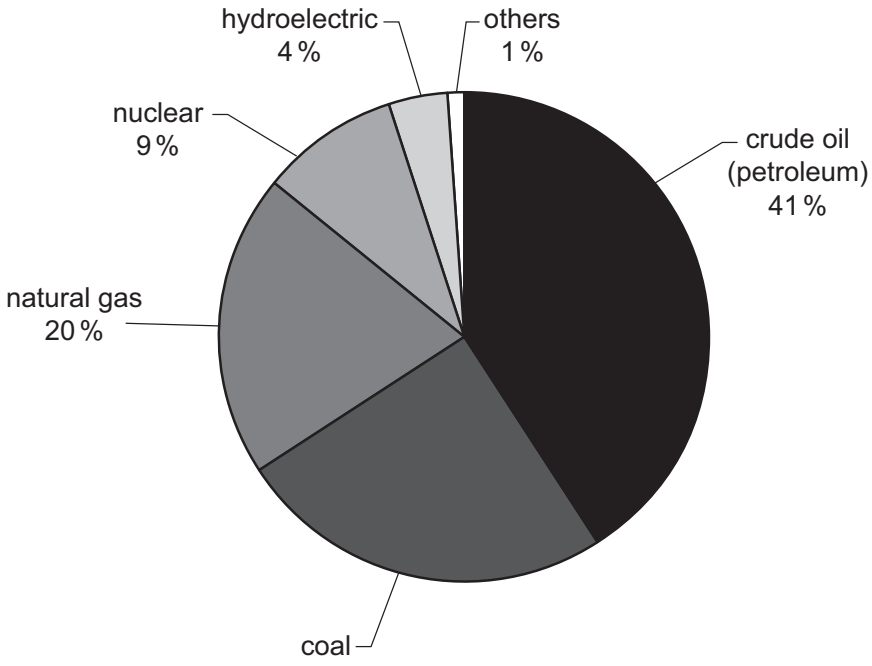
Explain your answer.

.....

..... [2]

4 Electricity is generated using different resources.

This pie chart shows the percentage of electricity generated in a country using different resources.



(a) What percentage of the electricity is generated using coal?

.....% [1]

(b) What type of resource are crude oil (petroleum), coal and natural gas?

..... [1]

(c) Write down **two other** energy resources **not** shown in the pie chart.

1 .....

2 .....

[2]

5 Gabriella makes some sugar.

It is important that the sugar is very pure.

(a) What is meant by a pure substance?

.....

..... [1]

(b) Gabriella makes 12.0 g of a solid.

The solid contains 10.8 g of sugar.

What is the percentage purity of sugar in the solid?

Use the equation shown.

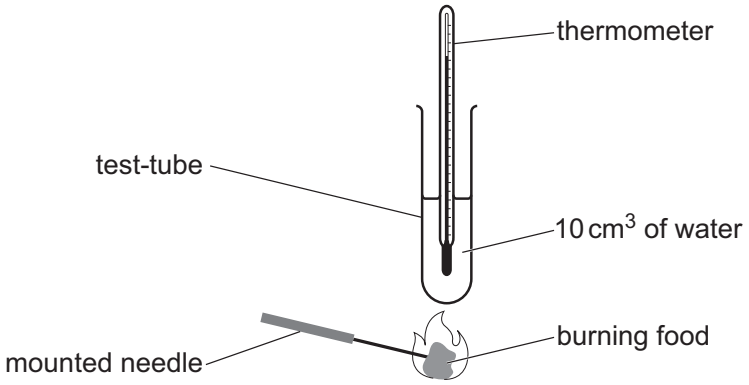
$$\text{percentage purity} = \frac{\text{mass of useful product}}{\text{total mass of solid}} \times 100$$

percentage purity = ... % [2]

6 Oliver investigates the amount of energy in different foods.

Look at the diagram.

It shows the equipment he uses.



Oliver:

- measures 1 g of food
- puts 10 cm^3 of water into a test-tube
- measures the starting temperature of the water
- sets the food on fire
- holds the burning food under the test-tube until the food stops burning
- measures the final temperature of the water.

Oliver repeats the experiment using different foods.

(a) Explain why Oliver uses the same mass of food each time.

.....

..... [1]

(b) Write down **one other** variable Oliver keeps the same.

..... [1]

Oliver writes his results in this table.

....	....	....
nut	28	64
biscuit	26	40
cereal	26	44
bread	27	38

(c) Complete the table by writing the headings in the table. [2]

(d) Write down the name of the food that contains the **most** energy.

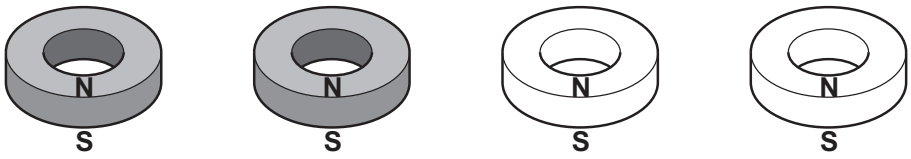
..... [1]

(e) Write down the name of the **nutrient** in food which provides a large amount of energy.

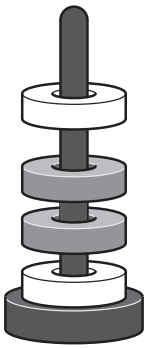
..... [1]

7 Ring magnets have a north pole, **N**, and a south pole, **S**.

Chen has a toy made with four ring magnets.



(a) Chen wants to use the four ring magnets to make the pattern in the diagram.



Explain how he does this.

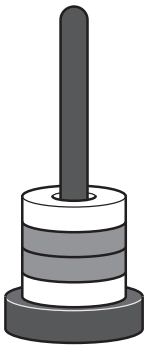
Use ideas about north poles and south poles.

.....

.....

..... [2]

(b) Chen now wants to use the four ring magnets to make a different pattern.



Explain how he does this.

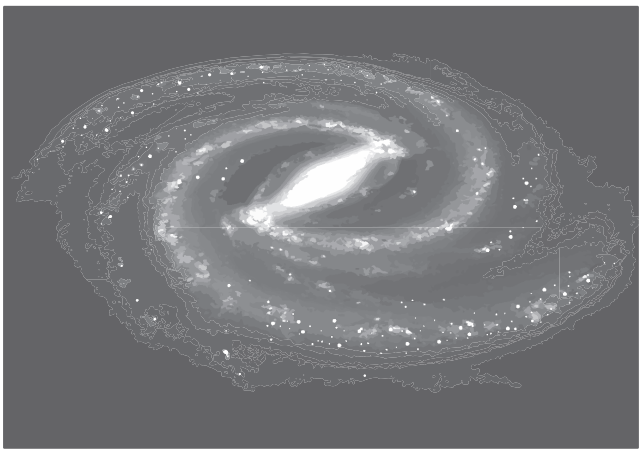
Use ideas about north poles and south poles.

.....

.....

..... [1]

8 Look at the picture of a galaxy.



(a) Write down **two** types of objects that make up a galaxy.

1 .....

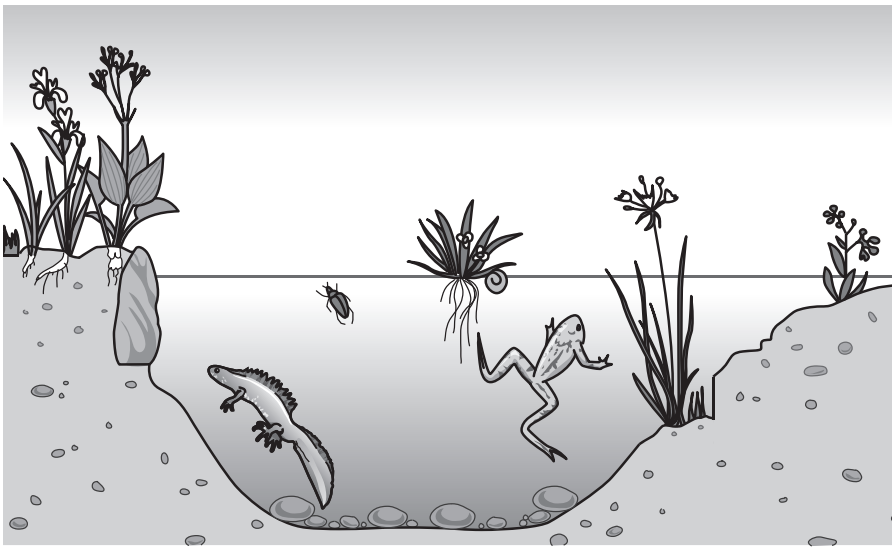
2 .....

[1]

(b) Write down the name of a piece of equipment scientists use to study galaxies.

..... [1]

9 Look at the picture of a pond.



(a) Circle the word that describes all the living and non-living things in the pond.

abiotic **biotic** **ecosystem** **food web** [1]

(b) Write down **two** habitats in the picture.

1 .....

2 .....

[2]

10 This question is about reactions of metals.

(a) Magnesium burns in oxygen to make a new substance.

Write the **word** equation for this reaction.

..... [1]

(b) Sodium reacts vigorously with water.

Write down **two** observations you make when sodium reacts with water.

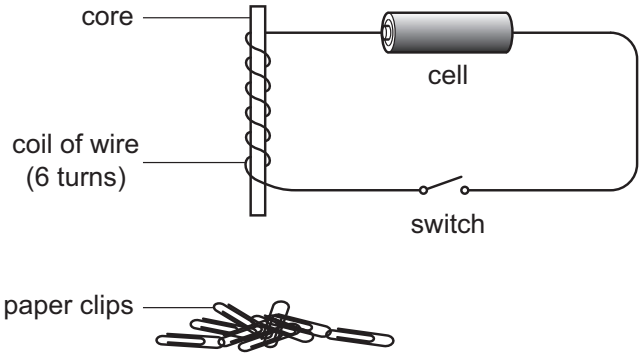
1 .....

2 .....

[2]

11 Aiko makes an electromagnet.

Look at the diagram of her equipment.



Aiko uses the electromagnet to pick up paper clips.

She makes this prediction,

'Increasing the number of turns of wire around the core will make a stronger electromagnet.'

Look at Aiko's results.

number of turns	number of paper clips picked up
2	1
4	3
6	5
8	6
10	7

(a) Is Aiko's prediction correct?

.....

Explain your answer using her results.

.....

.....

[1]

(b) Mia tells Aiko that she needs to improve her investigation.

Describe how Aiko improves her investigation.

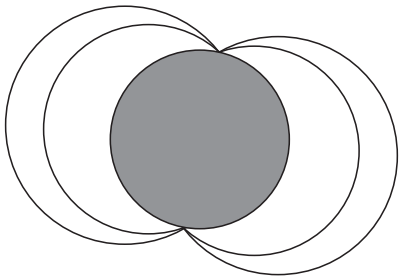
.....

Explain your answer.

.....

[2]

12 Yuri has drawn this diagram to show the magnetic field lines around the Earth.



NOT TO SCALE

(a) Complete the sentence below to explain why the Earth has a magnetic field.

The ..... of the Earth acts as a ...... [1]

(b) Name the piece of equipment that is used to show the direction of the magnetic field.

..... [1]

(c) Draw arrows on **each** of the magnetic field lines to show the direction of the magnetic field. [1]

13 Ahmed investigates the solubility of potassium nitrate in water at different temperatures.

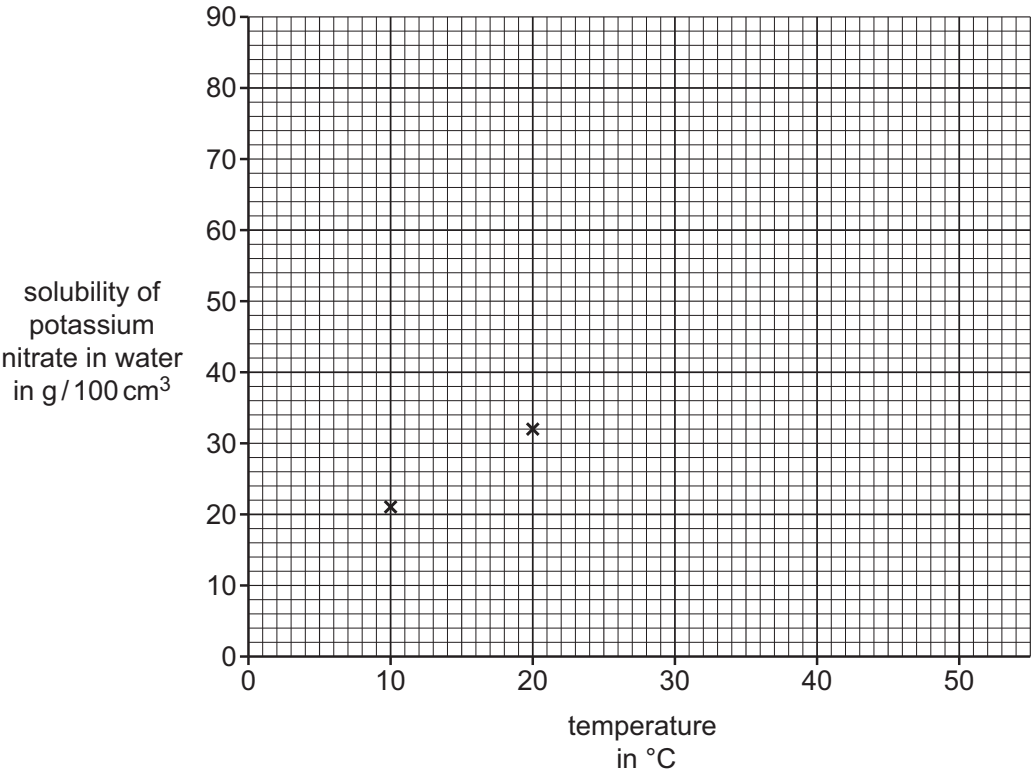
Look at his results.

temperature in °C	**solubility of potassium nitrate in water in g / 100 cm^3**
10	21
20	32
30	46
40	64
50	86

(a) Plot Ahmed's results on the grid.

Two points have been done for you.

Draw the curve of best fit through the points.

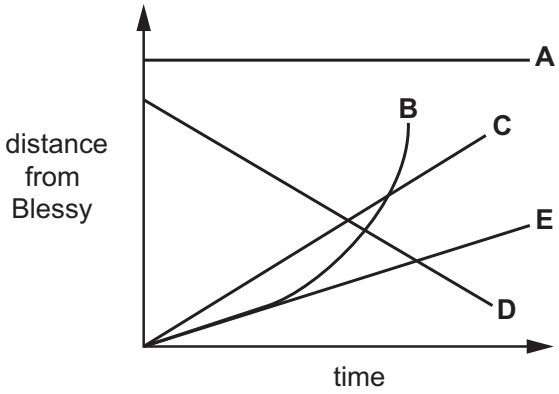


[2]

(b) Complete the sentence.

As the temperature increases, the solubility of potassium nitrate in water ..... . [1]

14 Blessy draws five different distance / time graphs on the same axes.



The distance axis shows how far an object is away from Blessy.

(a) Which graph shows a **stationary** object?

Circle the correct answer.

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

(b) Which graph shows an object moving **towards** Blessy?

Circle the correct answer.

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

(c) Which graph shows an object getting **faster**?

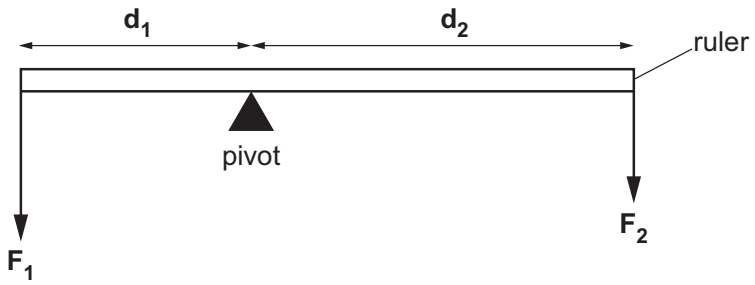
Circle the correct answer.

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

15 Look at the diagram.

It shows two different forces $\mathbf{F_1}$ and $\mathbf{F_2}$ acting on a ruler.

The ruler is balanced.



Explain why the ruler is balanced.

Use ideas about the principle of moments.

.....

.....

..... [2]