Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE
COMBINED SCIENCE: TRILOGY

F

Foundation Tier
Biology Paper 1F

Friday 10 May 2024 Morning Time allowed: 1 hour 15 minutes

Materials

For this paper you must have:
- a ruler
- a scientific calculator.

Instructions
- Use black ink or black ball-point pen.
- Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
TOTAL	

Information
- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

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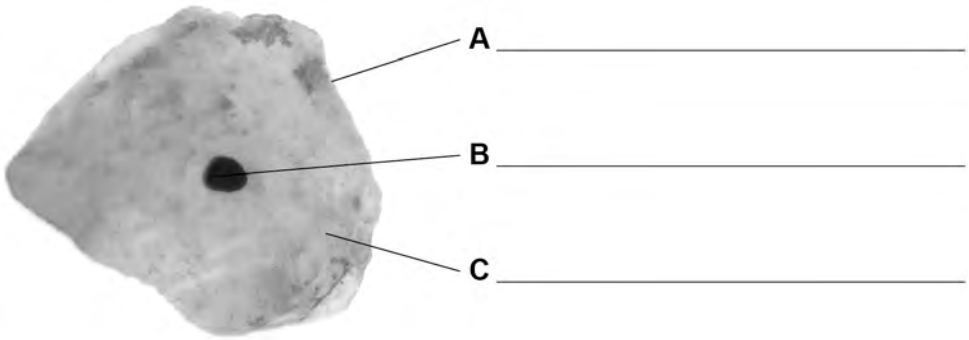
0 1 This question is about cells.

Figure 1 shows an animal cell.

Figure 1



0 1 . 1 Label parts **A**, **B** and **C** on **Figure 1**.

Choose answers from the box.

[3 marks]

cell membrane	**cell wall**	**chloroplast**
cytoplasm	**nucleus**	

Do not write outside the box

0 1 . 2 What is the function of the nucleus in a cell?

[1 mark]

Tick (✓) **one** box.

To contain a solution called cell sap ☐

To control the activities of the whole cell ☐

To control the movement of substances into the cell ☐

0 1 . 3 What is the function of the mitochondria in a cell?

[1 mark]

Tick (✓) **one** box.

To produce glucose during photosynthesis ☐

To produce proteins for the cell ☐

To release energy in respiration ☐

Question 1 continues on the next page

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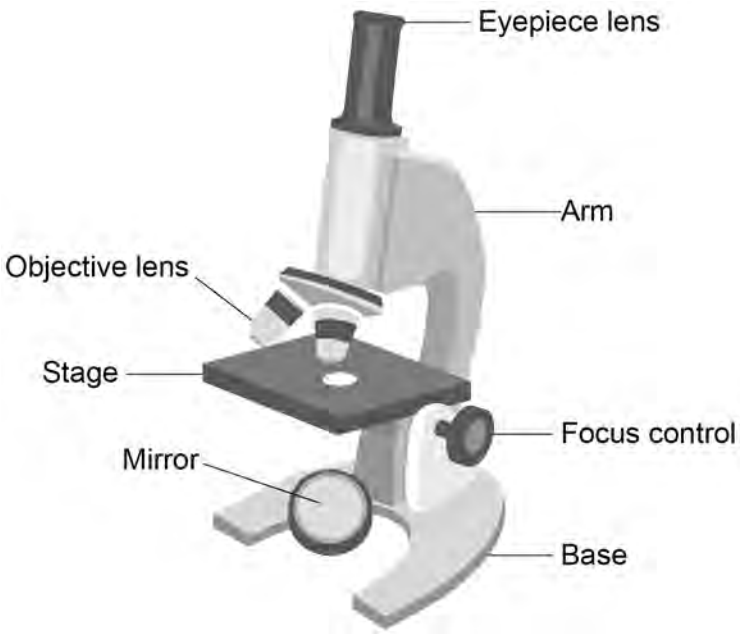
0 1 . 4 **Figure 2** shows a light microscope.

Figure 2



A student is given a prepared slide of animal cells to view using the microscope.

Complete the sentences.

Use labels from **Figure 2**.

[4 marks]

Place the slide on the _____.

Use the objective lens that has low power.

Look through the _____.

Direct the light by moving the _____.

Make the image larger by using the high power _____.

Do not write outside the box

0 1 . 5 **Figure 3** shows a different animal cell.

Figure 3

Calculate the magnification of the image in **Figure 3**.

Complete the following steps.

[4 marks]

Measure the width of the image from **Y** to **Z**, in millimetres (mm).

Width of image = _____ mm

Give the width of the image in micrometres (µm).

1 mm = 1000 µm

_____

Width of image = _____ µm

The cell in **Figure 3** has a real width of 40 micrometres (µm).

Use the equation to calculate the magnification.

$$\text{magnification} = \frac{\text{width of image in µm}}{\text{real width of cell in µm}}$$

_____

_____

_____

Magnification = × _____

13

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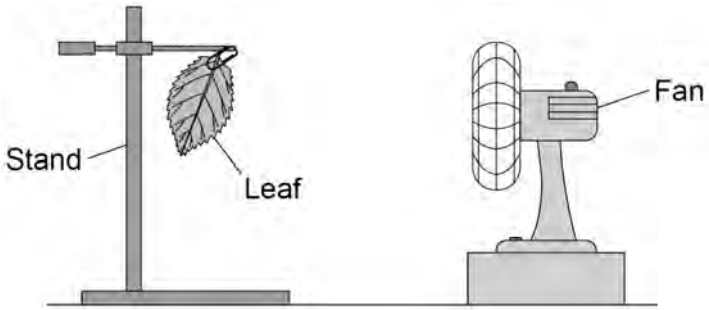
0 2 A student investigated the loss of mass from leaves that were placed in winds of different speed.

The student used an electric fan to create different wind speeds.

Figure 4 shows the apparatus.

Figure 4



This is the method used.

1. Record the mass of one leaf taken from a plant.

2. Attach the leaf to a stand.

3. Leave for 1 hour with the fan off.

4. Record the final mass of the leaf.

5. Repeat steps 1 to 4 with the fan set at different speeds. Use leaves of a similar size each time.

6. Calculate the loss of mass for each leaf.

Do not write outside the box

Table 1 shows the results.

Table 1

Fan setting	Loss of mass in grams
Off	0.06
Low speed	0.15
Medium speed	0.23
High speed	0.31

0 2 . 1 Why did the student do one experiment with the fan off?

[1 mark]

0 2 . 2 How does **increasing** fan speed affect the loss of mass from the leaves?

Use **Table 1**.

[1 mark]

0 2 . 3 Explain why the mass of the leaves decreased at all fan speeds.

[3 marks]

Do not write outside the box

0 2 . 4 The student repeated the investigation in a room at a higher temperature.

Complete the sentence.

Choose the answer from the box.

[1 mark]

smaller	**the same**	**greater**

At a higher temperature the loss of mass from the leaves

would be _____.

0 2 . 5 How could the student check the repeatability of the results?

[1 mark]

Tick (✓) **one** box.

Do the investigation again using a different method. ☐

Do the investigation again using a different type of plant. ☐

Do the investigation again using the same method. ☐

7

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Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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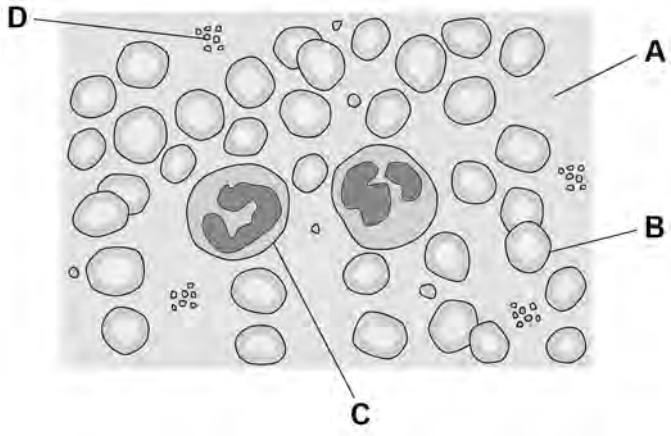
0 3 **Figure 5** shows different parts of blood.

Figure 5



0 3 . 1 Which letter shows a white blood cell?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 3 . 2 Which part of the blood causes the blood to clot?

[1 mark]

Tick (✓) **one** box.

Plasma ☐

Platelets ☐

Red blood cells ☐

0 3 . 3 Name **two** substances transported in the blood.

[2 marks]

1 _____

2 _____

Do not write outside the box

Healthy people can volunteer to donate blood.

The donated blood is then given to patients who need the blood.

When a volunteer donates blood:

- the volunteer's health is checked
- a needle is used to remove blood from a vein in the arm
- the volunteer rests for 15 minutes after the donation.

0 3 . 4 Suggest **one** reason why blood is removed from a vein and **not** from an artery.

[1 mark]

Patients may receive blood during a medical emergency.

Donating blood and receiving blood has risks.

0 3 . 5 Suggest **one** advantage and **one** disadvantage to a patient who **receives** blood.

[2 marks]

Advantage

Disadvantage

0 3 . 6 Suggest **one** advantage and **one** disadvantage to the volunteer who **donates** blood.

[2 marks]

Advantage

Disadvantage

9

Do not write outside the box

0 4 This question is about disease.

Gonorrhoea is a sexually transmitted disease.

0 4 . 1 Which is a symptom of gonorrhoea?

[1 mark]

Tick (✓) **one** box.

Damaged immune system ☐

Pain when urinating ☐

Reduced body temperature ☐

Table 2 shows the number of reported cases of gonorrhoea for 5 cities.

Table 2

City	Number of reported cases of gonorrhoea per 100 000 of the population
A	124
B	118
C	40
D	130
E	40

Do not write outside the box

0 4 . 2 The number of cases of gonorrhoea in each city might **not** be accurate.

Suggest **one** reason why.

[1 mark]

0 4 . 3 Which is the best way to present the data from **Table 2**?

[1 mark]

Tick (✓) **one** box.

Bar chart ☐

Line graph ☐

Scatter diagram ☐

0 4 . 4 The data is given as per 100 000 of the population and **not** as the total number of people with gonorrhoea.

Suggest why.

[1 mark]

Question 4 continues on the next page

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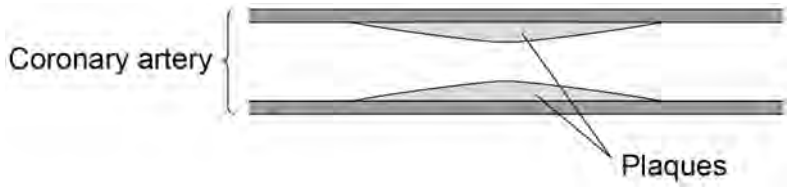
Deposits can form in coronary arteries.

The deposits are called plaques.

Plaques cause damage to the arteries.

Figure 6 shows plaques in a coronary artery.

Figure 6



0 4 . 5 Which **two** factors **increase** the risk of plaques forming in the coronary artery?

[2 marks]

Tick (✓) **two** boxes.

- High fat diet ☐
- Low blood glucose ☐
- Regular exercise ☐
- Smoking ☐
- Taking statins ☐

Do not write outside the box

0 4 . 6 Which treatment can be used for the plaques in **Figure 6**?

[1 mark]

Tick (✓) **one** box.

A placebo ☐

A stent ☐

An antibiotic ☐

0 4 . 7 A heart attack can happen when plaques block a coronary artery.

During a heart attack muscle cells in the heart die.

Explain how the blockage can lead to the death of muscle cells in the heart.

[3 marks]

10

Turn over for the next question

Do not write outside the box

0 5 This question is about photosynthesis.

0 5 . 1 Complete the equation for photosynthesis.

Choose answers from the box.

[2 marks]

nitrogen	**oxygen**	**ethanol**	**water**

carbon dioxide + _____ $\xrightarrow{\text{light}}$ glucose + _____

0 5 . 2 What is the chemical formula for glucose?

[1 mark]

Tick (✓) **one** box.

CO_2 ☐ $C_6H_{12}O_6$ ☐ H_2O ☐ O_2 ☐

0 5 . 3 Give **two** ways plants use the glucose produced by photosynthesis.

[2 marks]

1 _____

_____

2 _____

_____

Do not write outside the box

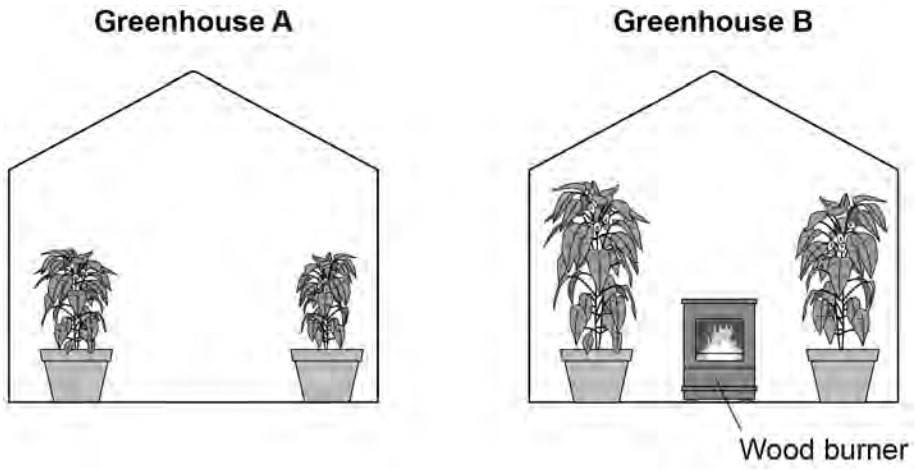
0 5 . 4 A person has two greenhouses.

In each greenhouse, the plants:

- are all the same type
- receive the same intensity of light and the same volume of water
- grow in the same type of soil.

Figure 7 shows the greenhouses.

Figure 7



The person burns logs in the wood burner in greenhouse **B**.

Explain why the plants in greenhouse **B** grow faster than the plants in greenhouse **A**.

[4 marks]

9

Turn over ►

Do not write outside the box

0 6 Drinks contain different substances.

A drinks company claims that a drink contains sugar, protein and fat.

0 6 . 1 Glucose and fructose are different sugars.

Fructose has a much sweeter taste than glucose.

Suggest **two** reasons why the drinks company uses fructose in the drink rather than using glucose.

Do **not** refer to sweetness in your answer.

[2 marks]

1 _____

_____

2 _____

_____

0 6 . 2 Describe how a student could test the drink for **sugar**.

Give the colour of a positive result.

[3 marks]

Test _____

_____

_____

_____

Colour of positive result _____

Do not write outside the box

0 6 . 3 Describe how a student could test the drink for **protein**.

Give the colour of a positive result.

[2 marks]

Test _____

_____

_____

Colour of positive result _____

Question 6 continues on the next page

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0 6 . 4 The human digestive system breaks down protein and fat in the drink.

Describe how **protein** and **fat** are digested.

You should include:

- the enzymes involved
- where the enzymes are produced.

[6 marks]

13

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Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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0 7 A student investigated the concentration of salt in solution **Z**.

The student used a method involving osmosis.

The student used tubing made of partially permeable membrane.

This is the method used.

1. Cut six pieces of tubing to the same length.

2. Tie one end of each piece of tubing.

3. Put the same volume of solution **Z** into each piece of tubing.

4. Tie the other end of each piece of tubing to form a sealed tube.

5. Record the mass of each tube.

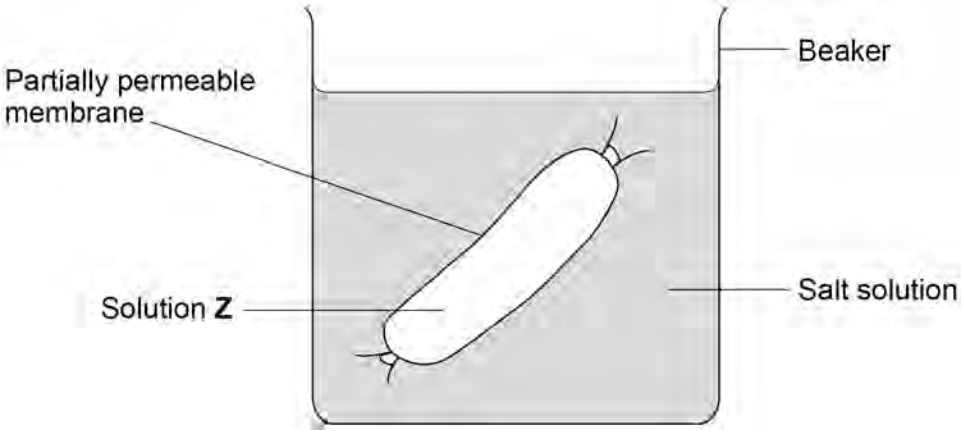
6. Place each tube into a different concentration of salt solution.

7. After 2 hours, remove each tube from the salt solutions.

8. Record the mass of each tube.

Figure 8 shows one of the sealed tubes in a salt solution.

Figure 8



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0 7 . 1 What was the independent variable for the investigation?

[1 mark]

Tick (✓) **one** box.

Change in mass of tube ☐

Concentration of salt solution ☐

Time in salt solution ☐

Volume of solution **Z** ☐

0 7 . 2 The student dried the outside of each tube with a paper towel before recording the mass.

Why was it important to dry the tubes?

[1 mark]

_____

_____

Question 7 continues on the next page

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Table 3 shows the results.

Table 3

Concentration of salt solution in mol/dm^3	Mass of tube in grams			Percentage (%) change in mass
	At start	After 2 hours	Change	
0.0	15.54	16.50	0.96	**X**
0.2	15.16	15.78	0.62	4.1
0.4	15.00	15.35	0.35	2.3
0.6	15.29	15.37	0.08	0.5
0.8	14.95	14.75	–0.20	–1.3
1.0	14.77	14.40	–0.37	–2.5

0 7 . 3 Calculate value **X** in **Table 3**.

Give your answer to 1 decimal place.

[3 marks]

Value **X** (1 decimal place) = _____ %

0 7 . 4 Complete **Figure 9**.

You should:

- plot the percentage change in mass from **Table 3** for salt concentrations of **only** 0.2 mol/dm^3 to 1.0 mol/dm^3
- draw a line of best fit.

One of the results has been plotted for you.

[3 marks]

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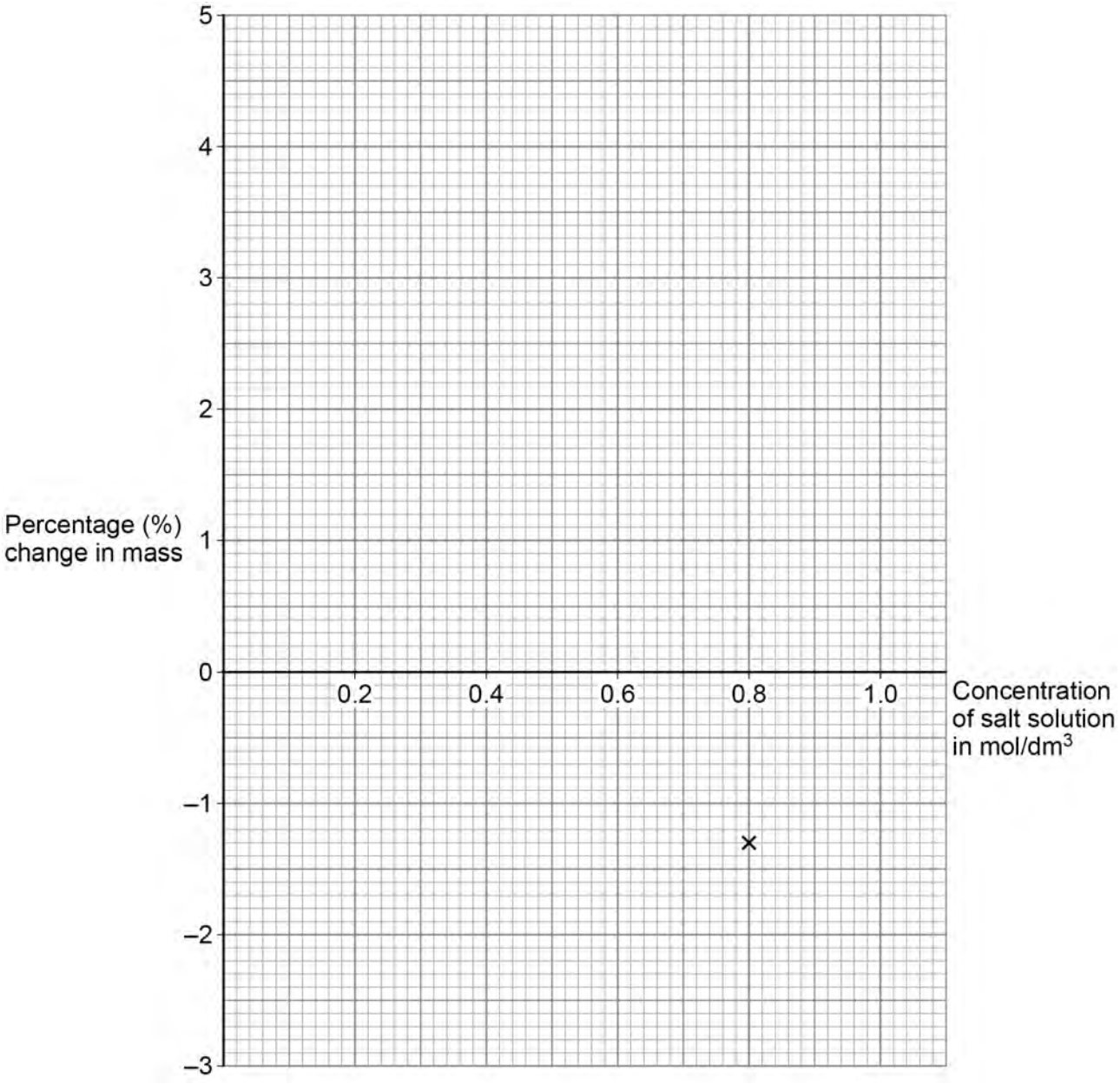
Figure 9



0 7 . 5 Determine the concentration of salt in solution **Z**.

Use **Figure 9**.

[1 mark]

Concentration = _____ mol/dm^3

9

END OF QUESTIONS

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ANSWER IN THE SPACES PROVIDED

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