# AQA Style

## GCSE
## COMBINED SCIENCE: TRILOGY

**F**

Foundation Tier          Biology Paper 1

Time allowed: 1 hour 15 minutes

Materials
- A ruler
- A pen and pencil
- A scientific calculator

Instructions
- Answer **all** questions using a black pen.
- Answer the questions in the space available and cross through any work you do not want to be marked.
- In any calculations, make sure you show your working out.

Information
- The maximum mark for this paper is 70.
- The marks available for each question are shown in brackets.
- You must make your work as neat as possible and use good English in your answers.
- You should make sure you leave time to check your answers.

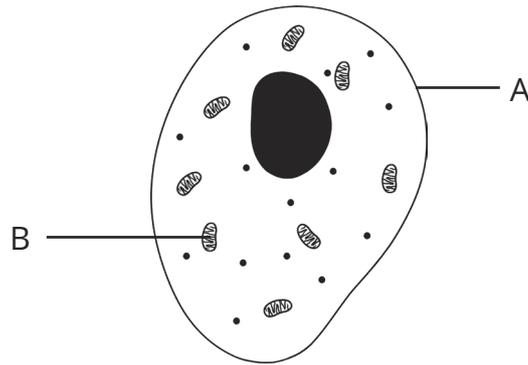| Question | Mark |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| **Total** | |

Name _____

Date _____

BEYOND
SCIENCE

0 1    **Figure 1** shows an animal cell.

**Figure 1**



0 1 . 1    What is structure **A**?

[1 mark]

Tick **one** box.

cell wall ☐

cytoplasm ☐

cell membrane ☐

flagellum ☐

0 1 . 2    What is structure **B**?
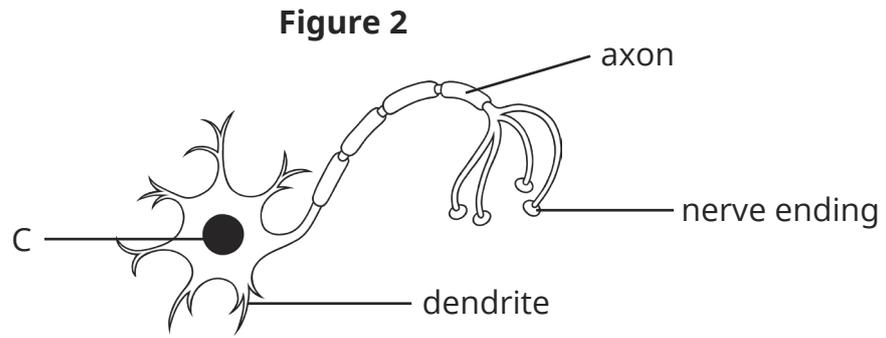
[1 mark]

Tick **one** box.

nucleus ☐

cytoplasm ☐

ribosome ☐

mitochondria ☐

0 1 . 3    **Figure 2** shows a nerve cell.

**Figure 2**



Name structure **C**.

[1 mark]

_____

0 1 . 4    Describe how a nerve cell is adapted to carry out its function.

[1 mark]

_____

_____

_____

| |
|---|
| 4 |

**Turn over for the next question.**

0 2   Pathogens are microorganisms that cause infectious disease.

0 2 . 1   Draw **one** line from each disease to the pathogen that causes it.

[4 marks]

| measles | | bacteria |
|---------|---|---------|
| *Salmonella* | | protist |
| rose black spot | | fungus |
| malaria | | virus |

0 2 . 2   Give **one** way that pathogens can be spread from one person to another.

[1 mark]

_____

_____

0 2 . 3   Some parts of the human body have adaptations to protect the body against pathogens.

**Table 1** shows some information about these defence systems.

Fill in the missing words to complete **Table 1**.

[3 marks]

**Table 1**

| Defence System | Adaptation | Function |
|----------------|------------|----------|
| skin | Covers the body. | Acts as a barrier to prevent pathogens from entering the body. |
| nose | Produces _____. | To trap pathogens. |
| _____ | The tubes are lined with cilia. | To move pathogens trapped in mucus up to the throat where it is swallowed. |
| stomach | Produces hydrochloric acid. | To _____ pathogens. |

8

0 3    During digestion, large food molecules are broken down into smaller soluble molecules by digestive enzymes.

0 3 . 1    Complete the sentences.

Choose answers from the box.

[3 marks]

| amino acids | amylase | carbohydrates |
| cellulose | lipase | lipids |

Fats are broken down into fatty acids and glycerol by _____.

_____ are broken down into simple sugars by carbohydrase.

Proteins are broken down into _____ by protease.

0 3 . 2    Describe how you would test a piece of food to show it contains protein.

[2 marks]

_____

_____

0 3 . 3    Starch is broken down by an enzyme called amylase.

Name **two** places in the body where amylase is produced.

[2 marks]

1. _____

2. _____

0 3 . 4    Bile is a substance that increases the rate of fat digestion.

Name the organ that produces bile.

[1 mark]

_____

0 3 . 5  Explain **one** way that bile increases the rate of fat digestion.
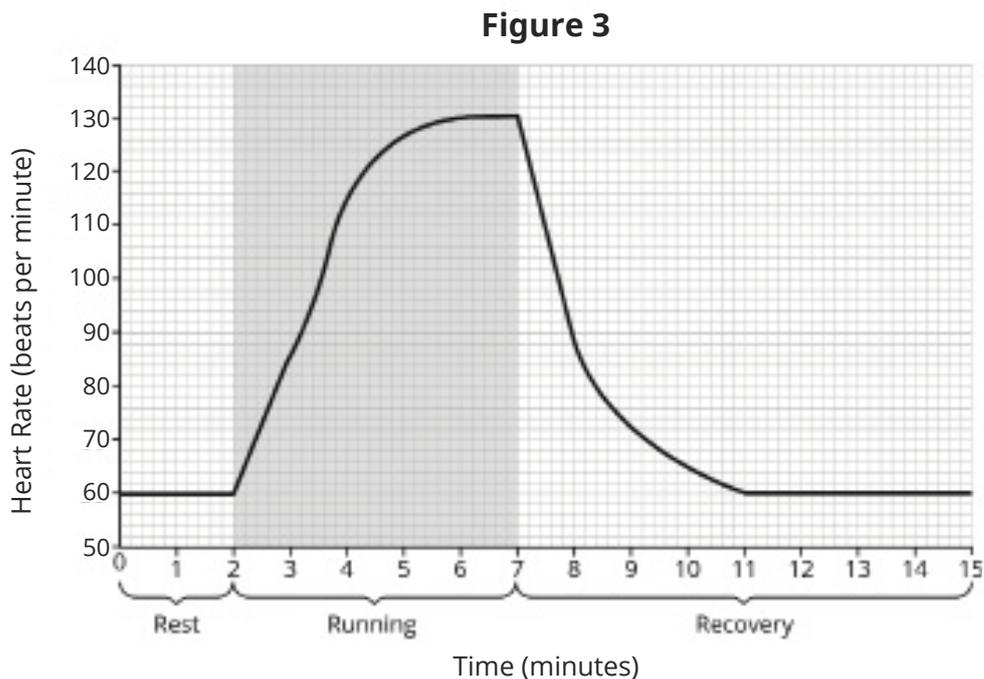
[2 marks]

_____

_____

_____

10

0 4　A person is training for a running event. Their heart rate was measured during their training. The results are shown in **Figure 3**.

**Figure 3**



0 4 . 1　Write down the maximum heart rate reached during the run.

[1 mark]

maximum heart rate = _____ beats per minute

0 4 . 2　Write down the time it took to return to resting heart rate after the person stopped running.

[1 mark]

time = _____ minutes

0 4 . 3　Explain why the person's heart rate increased during exercise.

[4 marks]

_____

_____

_____

_____

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_____

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0 4 . 4    After 5 minutes, the person's legs began to ache due to muscle fatigue.
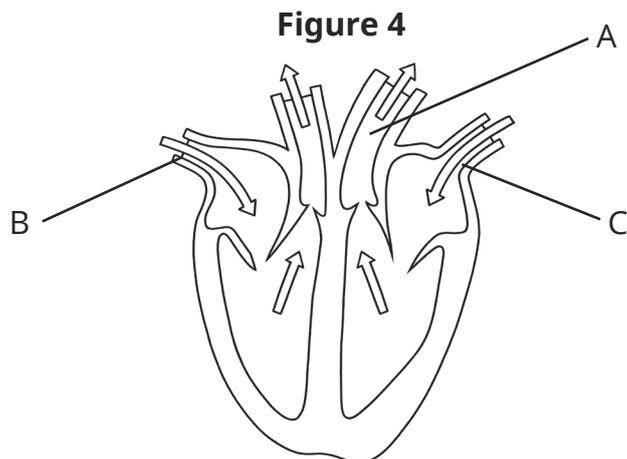
Explain what caused this muscle fatigue.

[2 marks]

_____

_____

| |
|---|
| 8 |

0 5 | **Figure 4** shows a diagram of the human heart.

**Figure 4**



0 5 . 1 | Name structure **A**.

[1 mark]

_____

0 5 . 2 | Draw **one** line from each part of the heart to its function.

[3 marks]

| A |

| To carry oxygenated blood from the heart to the rest of the body. |

| To carry deoxygenated blood from the heart to the lungs. |

| B |

| To carry deoxygenated blood from the body to the heart. |

| C |

| To carry oxygenated blood from the lungs to the heart. |

0 5 . 3 | In the UK, around 73 000 people die from coronary heart disease every year.

Explain how coronary heart disease affects the heart.

[4 marks]

_____

_____

_____

_____

**BEYOND** S C I E N C E

0 5 . 4  Explain **one** way that coronary heart disease can be treated.

[2 marks]

_____

_____

_____

10

0 6    Some students investigated the effect of different concentrations of sugar solution on pieces of carrot.

The students used the method below.

1.  Cut a carrot into six sticks.

2.  Measure the mass of each carrot stick.

3.  Place each carrot stick into a test tube containing a different concentration of sugar solution and leave them for 2 hours.

4.  After 2 hours, remove each carrot stick from the solution and place on blotting paper for 30 seconds.

5.  Measure the mass of each carrot stick again.

0 6 . 1   Suggest why students placed the carrots on blotting paper for 30 seconds.

[1 mark]

_____

_____

0 6 . 2   Suggest **two** improvements that the students could make to their method.

[2 marks]

1.  _____

_____

2.  _____

_____

06.3 **Table 2** shows the students' results.

**Table 2**

| Concentration of Sugar Solution (arbitrary units) | Mass of Carrot Stick at Start (g) | Mass of Carrot Stick after 24 Hours (g) | Change in Mass (g) | Percentage (%) Change in Mass |
|---|---|---|---|---|
| 1.0 | 20.0 | 28.8 | +8.8 | +44 |
| 2.0 | 18.0 | 21.6 | +3.6 | +20 |
| 3.0 | 16.0 | 16.8 | +0.8 | |
| 4.0 | 21.2 | 17.8 | -3.4 | -16 |
| 5.0 | 13.0 | 10.4 | -2.6 | -20 |
| 6.0 | 17.0 | 7.5 | -9.5 | -56 |

Calculate the percentage change in mass for the carrot stick that was placed in the sugar solution of 3.0 arbitrary units.

Show your working.

[2 marks]

_____

_____

_____

percentage change in mass = _____%


06.4 Explain why it is useful to calculate the percentage (%) change in mass of each carrot stick.
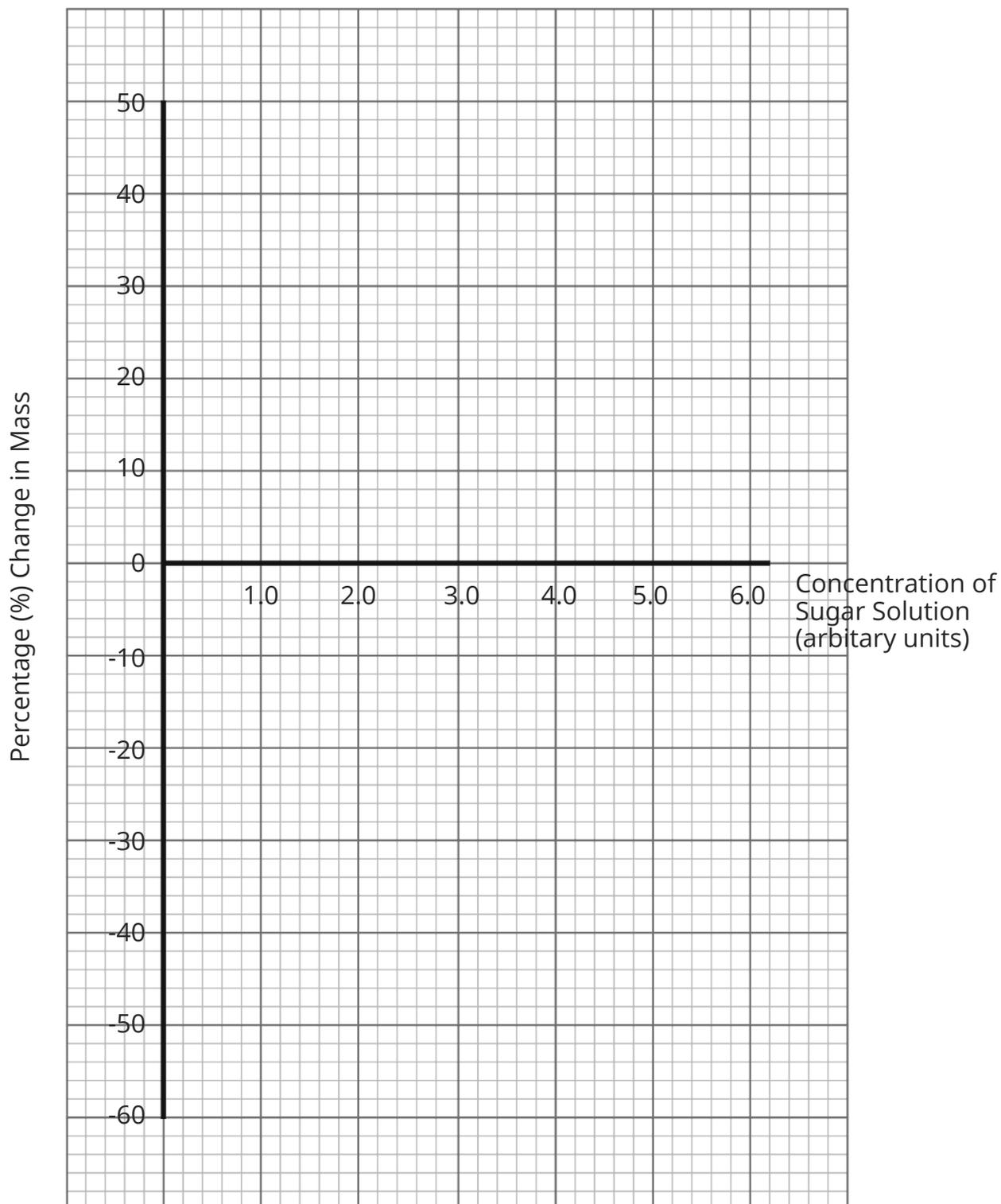
[2 marks]

_____

_____

_____

0 6 . 5   Complete **Figure 5** using the results in **Table 2**.

   • Plot the percentage change in mass for each concentration of sugar solution.

   • Draw a line of best fit, ignoring any anomalous results.

[3 marks]

**Figure 5**

0 6 . 6    Explain why the percentage change in mass was negative in sugar solutions with a concentration above 4.0 arbitrary units.

[3 marks]

_____

_____

_____

_____

_____

_____

13

0 7    **Figure 6** shows some of the apparatus used to investigate the effect of pH on the rate of enzyme activity.

**Figure 6**



Describe a method that could be used to investigate the effect of pH on the rate of enzyme activity.

You should include:
• any equipment not shown in the diagram;
• what you would measure;
• variables you would control.

[6 marks]

_____

_____

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6

**0 8**     **Figure 7** shows some plant cells viewed using a light microscope. The cells are magnified 200 times.

**Figure 7**
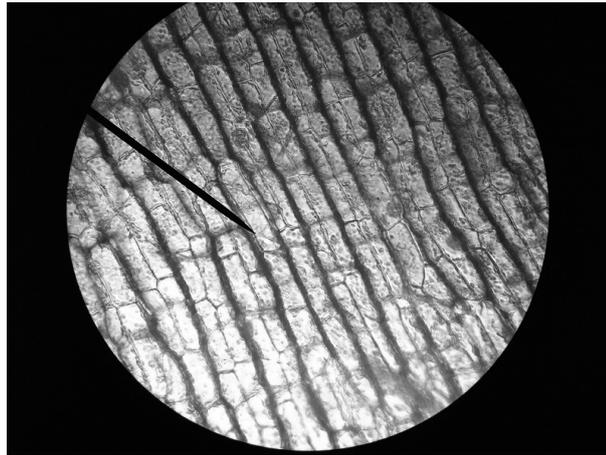
**0 8** . **1**     The length of one cell in the image is 14mm.

Use the equation to calculate the real length of the plant cell in mm.

$$\text{magnification} = \frac{\text{image size}}{\text{real size}}$$

[2 marks]

_____

_____

_____

real size = _____ mm

**0 8** . **2**     Convert the real size of the cell to micrometres.

[1 mark]

_____ μm

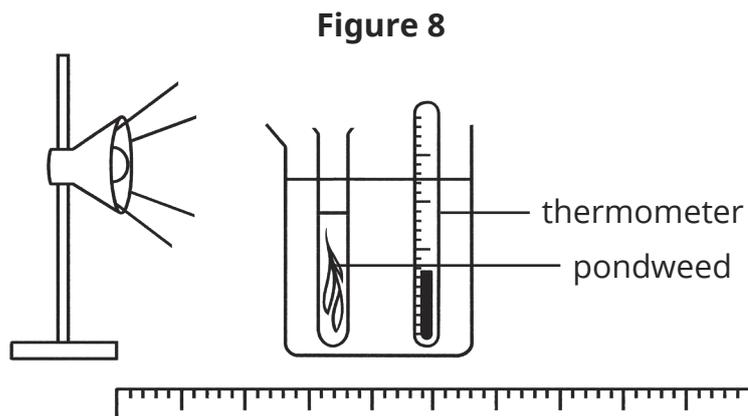**0 8** . **3**     Plant cells contain chloroplasts to absorb light energy for photosynthesis.

Complete the word equation for photosynthesis.

[2 marks]

light energy

carbon dioxide + _____ $\longrightarrow$ _____ + _____

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08.4 A student investigated the effect of light intensity on the rate of photosynthesis. **Figure 8** shows the apparatus they used.

**Figure 8**



Describe how the student used the apparatus to measure the rate of photosynthesis.

[2 marks]

_____

_____

_____

08.5 Explain why the test tube was placed in a beaker of water.
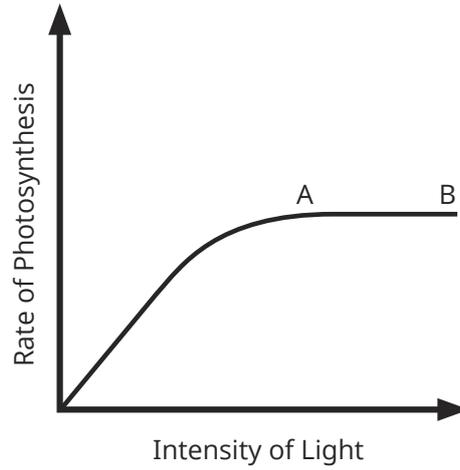
[2 marks]

_____

_____

**Question 8 continues on the next page**

08 . 6   **Figure 9** shows a graph of the student's results.

**Figure 9**



Explain the shape of the graph between points **A** and **B**.

[2 marks]

_____

_____

_____

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**END OF QUESTIONS**

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