

# AQA

GCSE

# Biology

## SET A – Paper 1 Higher Tier

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# H

### Materials

Time allowed: 1 hour 45 minutes

#### For this paper you must have:

- a ruler
- a calculator.

### Instructions

- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

### Information

- There are 100 marks available on this paper.
- 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.
- When answering questions 03.1, 09.2 and 10.2 you need to make sure that your answer:
  - is clear, logical, sensibly structured
  - fully meets the requirements of the question
  - shows that each separate point or step supports the overall answer.

### Advice

- In all calculations, show clearly how you work out your answer.

Name: .....

**01** The human body protects itself against pathogens in different ways.**01.1** Draw **one** line from each part of the body to the way it protects the body against pathogens.

Part of the body	Way it protects the body
Platelets	Acts as a barrier
Skin	Forms clots to seal wounds
Stomach	Secretes mucus to trap pathogens
Trachea and bronchi	Produces acid to kill pathogens

**[3 marks]****01.2** Describe **one** advantage and **one** disadvantage of using antibiotics against pathogens.

Advantage: .....

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Disadvantage: .....

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**[2 marks]****01.3** Explain how vaccination can protect the body against illness caused by pathogens.

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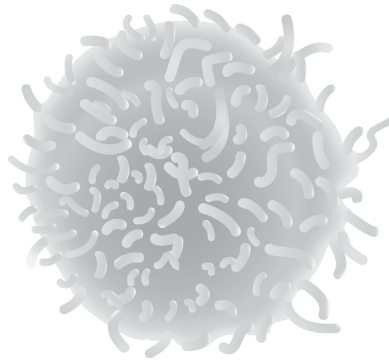
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**[4 marks]**

02 Many organisms are multicellular.

02.1 Figure 2.1 shows an image of a white blood cell.

Figure 2.1



The diameter of the image is 60 mm

The image has been magnified 5000 times.

Calculate the actual size of the cell in  $\mu\text{m}$

Use the formula:

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

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Actual size: .....  $\mu\text{m}$  [4 marks]

Question 2 continues on the next page

**02.2** Electron microscopes can be used to view sub-cellular structures in detail.

Electron microscopes have a greater resolution (resolving power) than light microscopes.

Explain the difference between **resolution** and **magnification**.

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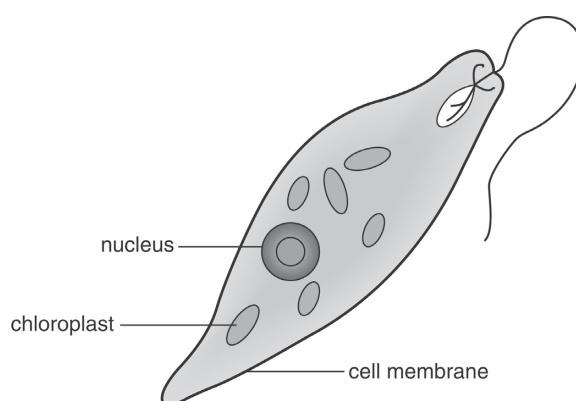
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**[2 marks]**

**02.3** Figure 2.2 shows a single-celled organism called *Euglena*.

**Figure 2.2**



*Euglena* has been classified as a protist.

Suggest why it has **not** been classified as an animal, a plant or a bacterium.

It is **not** an animal because .....

.....

It is **not** a plant because .....

.....

It is **not** a bacterium because .....

.....

**[3 marks]**



03.2 Complete Table 3.1

Table 3.1

Enzyme	Substrate	Product
Amylase	Starch	Sugar
Protease		
Lipase		

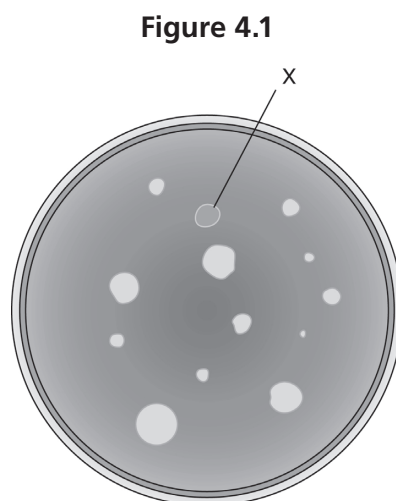
[4 marks]

03.3 Describe how to test for sugars.

[3 marks]

**04** A student grew some bacterial colonies from a pure culture on an agar plate.

**Figure 4.1** shows the results.



**04.1** How many bacteria were originally put on the agar plate?

Give a reason for your answer.

How many: .....

Reason: .....

[2 marks]

**04.2** All the colonies look similar except for colony **X**.

Suggest why colony **X** looks different.

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[1 mark]

Question 4 continues on the next page

**04.3** Describe **two** ways the student could improve the practical technique to make sure all the colonies look similar.

1. ....

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2. ....

.....

**[2 marks]**

**04.4** The student measured the diameter of the largest colony as 17.0 mm

Calculate the cross-sectional area of the colony using the equation:

$$\text{area} = \pi r^2$$

Use  $\pi = 3.14$

Give your answer in **mm<sup>2</sup>** in **standard form**.

Give your answer to **3 significant figures**.

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Answer = ..... mm<sup>2</sup> **[4 marks]**

**04.5** Some of the colonies are **not** perfectly circular.

Suggest what the student should do to work out the diameter of one of these colonies.

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**[1 mark]**



**05** Rose black spot is a fungal disease that affects plants.

It causes purple or black spots on leaves.

The leaves then often turn yellow and drop early.

**05.1** Plants infected with rose black spot grow much more slowly than plants that are **not** infected.

Explain why the infected plants grow more slowly.

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**[3 marks]**

**05.2** Give **two** methods to prevent rose black spot from spreading, without destroying the plants.

Explain how each method works.

Method 1: .....

Explanation:

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Method 2: .....

Explanation:

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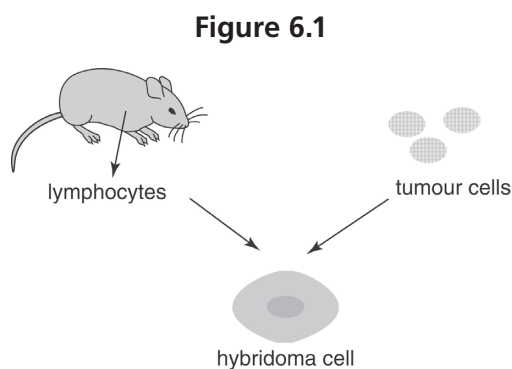
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**[4 marks]**

**Turn over >**

06 Making monoclonal antibodies starts with combining mouse lymphocytes with tumour cells.

Figure 6.1 shows how this forms a hybridoma cell.



06.1 Explain why a hybridoma cell has to be made first in order to produce monoclonal antibodies.

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[4 marks]

06.2 What do monoclonal antibodies bind to?

Tick **one** box.

- |             |                          |
|-------------|--------------------------|
| Antibiotics | <input type="checkbox"/> |
| Antibodies  | <input type="checkbox"/> |
| Antigens    | <input type="checkbox"/> |
| Antitoxins  | <input type="checkbox"/> |

[1 mark]

**06.3** Explain how monoclonal antibodies can be used to kill cancer cells.

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**[2 marks]**

**06.4** Explain the advantage of using monoclonal antibodies to kill cancer cells, compared with using other treatments.

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**[2 marks]**

- 07** A student investigated osmosis using pieces of potato, and sucrose solutions of different concentrations.

This is the method used:

1. Cut pieces of potato of the same size and shape.
2. Measure the mass of each piece.
3. Leave each piece of potato in a different concentration of sucrose solution for one hour.
4. Remove each piece of potato, dry it with a cloth and measure its mass again.

**Table 7.1** shows the student's results.

**Table 7.1**

Concentration of sucrose in mol per dm <sup>3</sup>	Mass of potato piece before being put in solution in g	Mass of potato piece after being put in solution in g	Percentage change in mass %
0.0	24.1	31.6	+31.1
0.2	24.0	29.0	
0.4	24.2	23.7	-2.1
0.6	23.9	19.3	-19.2
0.8	24.1	19.0	-21.2

- 07.1** Calculate the percentage change in mass for the potato in the 0.2 mol per dm<sup>3</sup> sucrose solution.

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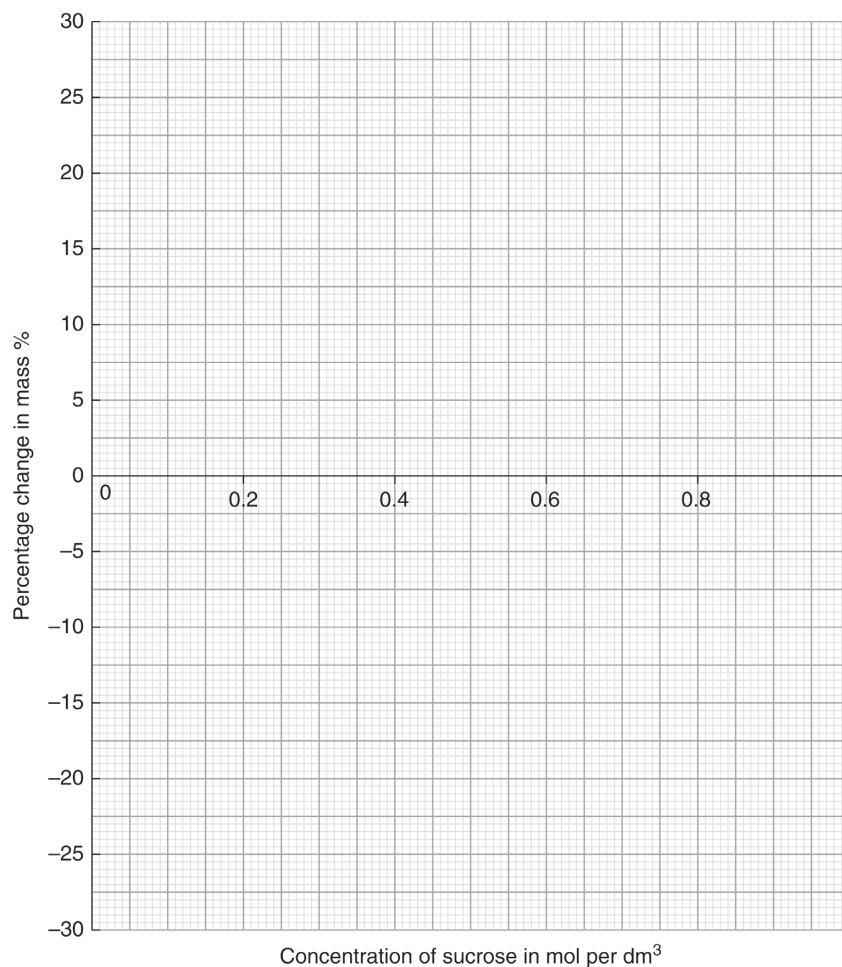
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Percentage change: ..... % **[3 marks]**

**07.2** Plot the data from **Table 7.1** and your answer to 07.1 onto **Figure 7.1**

Draw a smooth curved line of best fit.

**Figure 7.1**



**[3 marks]**

**07.3** Look at **Figure 7.1**

What concentration of sucrose would have the same concentration of water molecules as in the pieces of potato?

Answer: ..... mol per dm<sup>3</sup> **[1 mark]**

**Question 7 continues on the next page**

**07.4** Why was it important to cut all the pieces of potato to be as near as possible the same size and shape?

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**[2 marks]**

**07.5** Why was it important to dry each piece of potato before measuring its mass a second time?

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**[1 mark]**

**08** Figure 8.1 shows some insects feeding on a rose plant in a garden.

The insects feed by putting their mouthparts into the plant's phloem tissue.

**Figure 8.1**



**08.1** Suggest why the insects feed from the phloem tissue.

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**[1 mark]**

**08.2** Describe **two** ways in which the structure of phloem tissue is different from the structure of xylem tissue.

1. ....  
.....  
2. ....  
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**[2 marks]**

**Question 8 continues on the next page**

**08.3** A gardener might use a guidebook to identify the insects as aphids.

Suggest why identifying the insects might be useful for a gardener.

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[1 mark]

**08.4** During a hot day, rose plant leaves start to droop.

The stomata in the leaves close.

Explain why the stomata close.

Explain why this might also be a disadvantage for the plant.

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[4 marks]

**08.5** A gardener buys some insecticide liquid to kill aphids.

The instructions tell the gardener to pour the insecticide onto the soil around the plant.

The insecticide is taken in with water from the soil and travels to the top of the plant.

Describe how the insecticide will get from the soil to the top of the plant.

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[3 marks]



**09** Many diseases can be affected by lifestyle factors such as diet.

**09.1** Explain why a diet that is too high in fat may lead to coronary heart disease.

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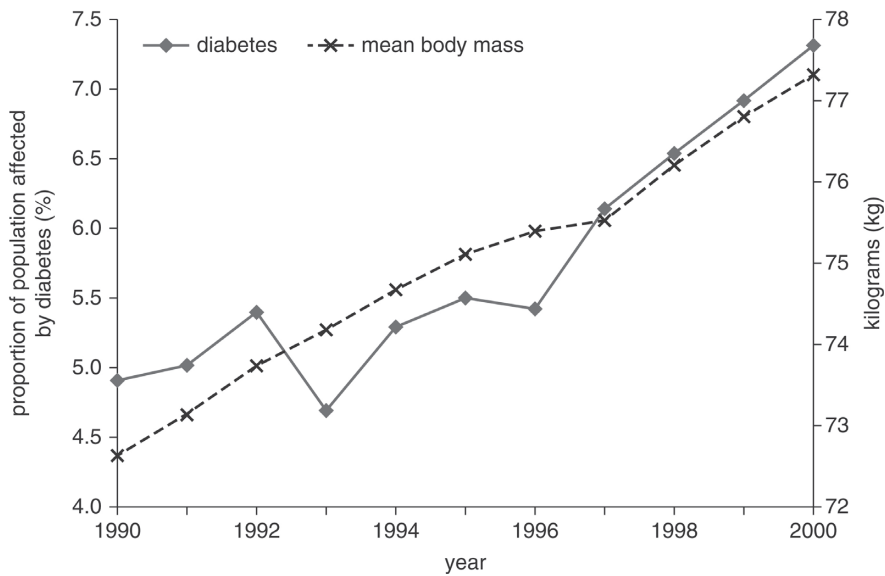
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**[4 marks]**

**Question 9 continues on the next page**

09.2 Figure 9.1 shows data for obesity and Type 2 diabetes.

Figure 9.1



Evaluate whether the data from Figure 9.1 shows that obesity is a risk factor for Type 2 diabetes.

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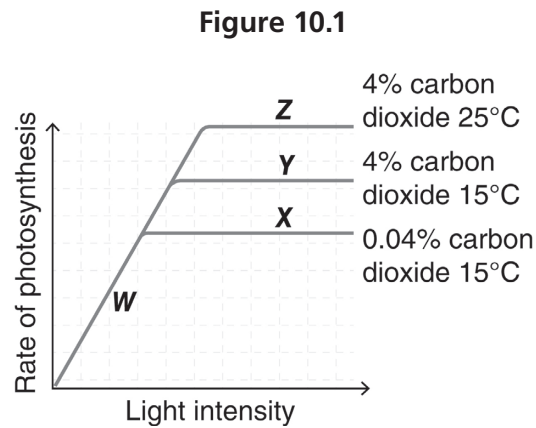
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[6 marks]

10 Figure 10.1 shows the effects of different limiting factors on the rate of photosynthesis.



10.1 Identify the limiting factors at points **W**, **X** and **Y** on Figure 10.1

Explain the reasons for your answers.

Limiting factor at point **W**: .....

Explanation: .....

Limiting factor at point **X**: .....

Explanation: .....

Limiting factor at point **Y**: .....

Explanation: .....

[6 marks]

Question 10 continues on the next page

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**END OF QUESTIONS**