



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

AS BIOLOGY

Paper 1

Monday 11 May 2026

Morning

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a ruler with millimetre measurements
- a scientific calculator.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- 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).
- Show all your working.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for the questions are shown in brackets.
- The maximum mark for this paper is 75.

For Examiner's Use	
Question	Mark
1	
2	
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8	
9	
TOTAL	



J U N 2 6 7 4 0 1 1 0 1

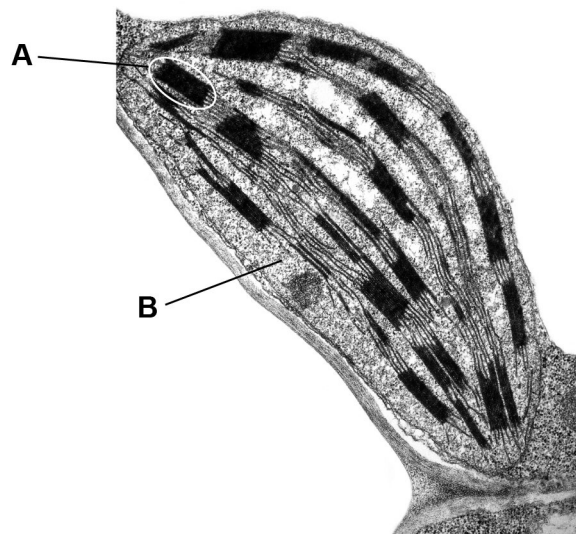
Answer **all** questions in the spaces provided.

0 1 . 1 Describe the function of a chloroplast.

[2 marks]

0 1 . 2 Figure 1 shows a chloroplast.

Figure 1



Name the parts of the chloroplast labelled **A** and **B**.

[2 marks]

A _____

B _____



0 1 . 3

In a particular plant cell:

- the volume of the nucleus is $523 \mu\text{m}^3$
- the diameter of the nucleolus is $5 \mu\text{m}$
- it is assumed both the nucleus and nucleolus are spherical.

$$\text{Volume of a sphere} = \frac{4\pi r^3}{3}$$

Use $\pi = 3.14$

Calculate the percentage of the nucleus volume taken up by the nucleolus.

Show your working **and** give your answer to **one** decimal place.**[2 marks]**

Answer _____ %

6

Turn over for the next question**Turn over ►**

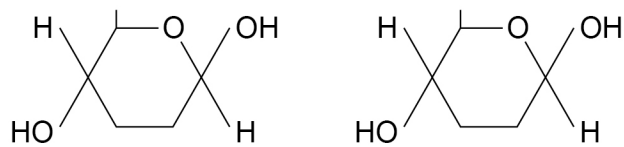
0 2 . 1

Describe the biochemical test to confirm that glucose is a reducing sugar.

[2 marks]

Figure 2 shows the structure of two β -glucose monomers.

Figure 2



0 2 . 2

On **Figure 2**, draw a box around **one** chemical group in **each** β -glucose molecule that is used to form a bond in a condensation reaction.

Name the bond formed.

[2 marks]

Name of bond _____



0	2	.	3
---	---	---	---

A molecule of cellulose is made from many β -glucose monomers.

Explain how the structure of cellulose molecules is related to their function in plant cells.

[3 marks]

7

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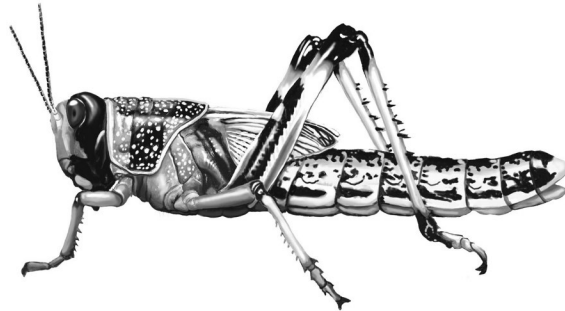


0 3

A student investigated the gas exchange system of a grasshopper, a species of insect.

Figure 3 shows a grasshopper.

Figure 3



0 3 . 1

The student dissected the grasshopper to isolate its tracheal system. Part of the tracheal system was mounted on a microscope slide and stained using methylene blue.

Table 1 shows the risk assessment prepared by the student.

Table 1

Source of risk	Hazard	Control measure to reduce risk
Scalpel	Cuts and puncture wounds	
Methylene blue	Irritant	

Complete **Table 1** by giving **one** control measure for each source of risk.

[2 marks]



0 3 . 2

The student could see small holes along the length of the grasshopper. These structures are involved in gas exchange.

Name these small holes.

Give **one** disadvantage to the grasshopper of using these holes for gas exchange.

[2 marks]

Name _____

Disadvantage _____

0 3 . 3

The small holes along the length of the grasshopper can be opened or closed.

When the grasshopper is flying, the holes are closed for shorter periods of time than when at rest.

Explain why.

[3 marks]

Turn over for the next question

Turn over ►



0	4	.	1
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Give **two** ways in which meiosis produces genetic variation.

[2 marks]

1

2

0	4	.	2
---	---	---	---

Describe and explain the appearance of a chromosome during metaphase of the **first** meiotic division.

[2 marks]

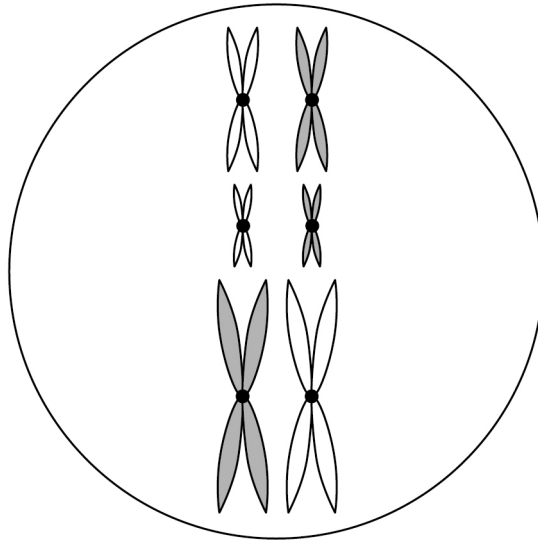


Yeasts are unicellular fungi.

0 4 . 3

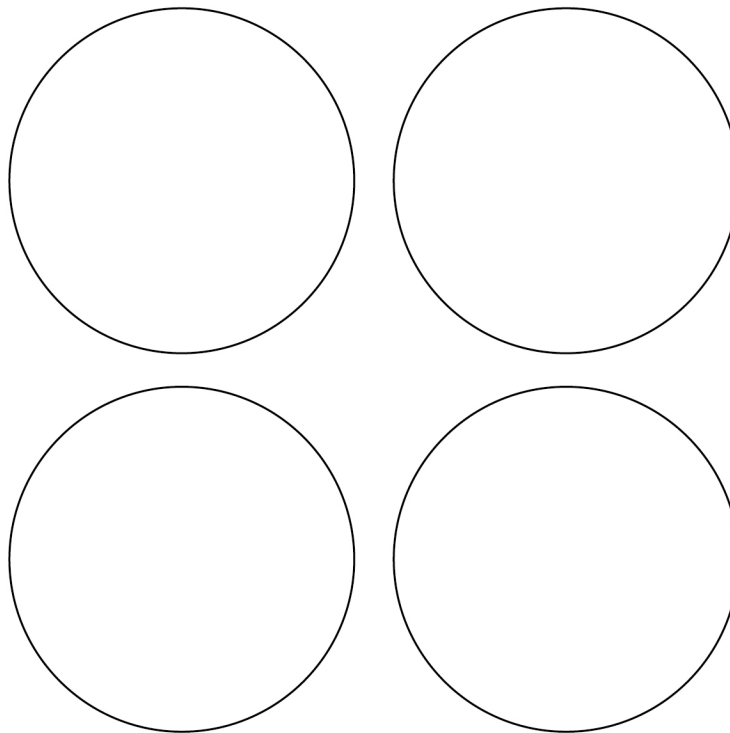
Figure 4 shows the arrangement of chromosomes in a yeast cell during metaphase of the **first** meiotic division.

Figure 4



Complete **Figure 5** to show the chromosome content of **each** of the four cells that result from meiosis of the cell in **Figure 4**.

Figure 5



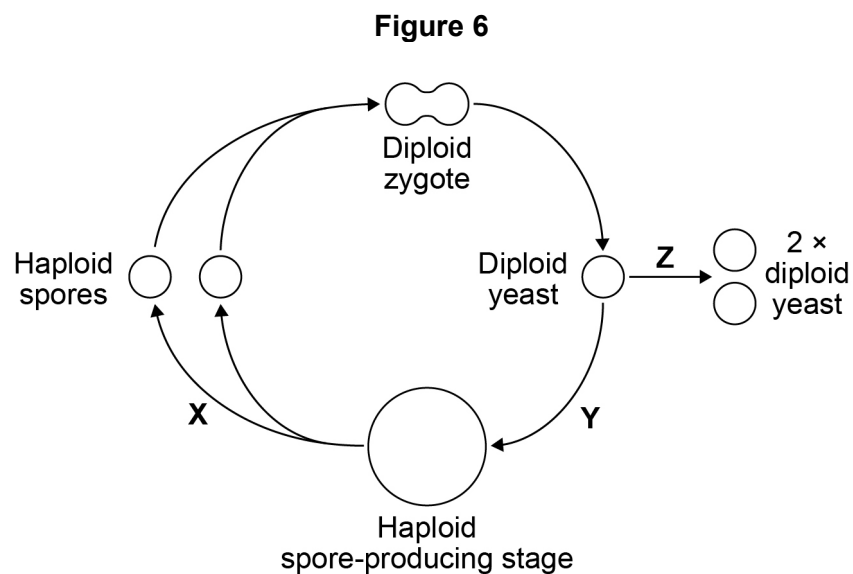
[2 marks]

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0 4 . 4

Figure 6 shows the life cycle of one species of yeast.



Mitosis and meiosis are involved in this life cycle.

Which row correctly identifies each process in **Figure 6**?

Tick (✓) **one** box.

[1 mark]

X is meiosis, **Y** is mitosis, **Z** is mitosis

☐

X is mitosis, **Y** is meiosis, **Z** is mitosis

☐

X is meiosis, **Y** is meiosis, **Z** is mitosis

☐

X is mitosis, **Y** is mitosis, **Z** is meiosis

☐

7



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0 5 . 1

Describe **two** ways a cell could be adapted for rapid transport of substances across its cell-surface membrane.

[2 marks]

1 _____

2 _____

0 5 . 2

Epithelial cells in the kidney absorb oxygen molecules and chloride ions (Cl^-).

Explain how oxygen molecules and Cl^- can pass through the cell-surface membrane.

[3 marks]

Oxygen molecules _____

Chloride ions _____



0 5 . 3

For a kidney epithelial cell:

- the **external** Cl^- concentration is 4.97 g dm^{-3}
- the Cl^- concentration in the cytoplasm is 30% of the external concentration
- the volume of the cytoplasm is $5.05 \times 10^{-13} \text{ dm}^3$

Calculate the concentration of Cl^- in the cytoplasm of the kidney epithelial cell.Then calculate, in ng, the mass of Cl^- in the cytoplasm of the kidney epithelial cell. $1 \text{ ng} = 1 \times 10^{-9} \text{ g}$.

Show your working.

[3 marks]Concentration of Cl^- in the cytoplasm _____ g dm^{-3} Mass of Cl^- in the cytoplasm _____ ng

8

Turn over for the next question**Turn over ►**

06.1

Hedges can contain several different plant species.

Explain why planting hedges increases the biodiversity of insects.

[2 marks]

Hawthorn is a type of plant found in hedges.

Scientists investigated the biodiversity of butterflies along a hedge made from only hawthorn plants.

The scientists:

- divided the hedge into three sections and treated each section differently:
 - **Treatment 1:** no cutting of the hawthorn hedge
 - **Treatment 2:** cutting the hawthorn hedge to 2.4 m in height
 - **Treatment 3:** cutting the hawthorn hedge to 1.2 m in height.
- left each plot to grow for four years.

After four years, the scientists made 19 visits to the hedge. For each treatment, they collected data to calculate:

- the mean species richness of butterflies
- the mean index of diversity for butterflies.

Table 2 shows the scientists' results.



Table 2

	Treatment 1 (no cutting)	Treatment 2 (cut to 2.4 m)	Treatment 3 (cut to 1.2 m)
Mean species richness of butterflies	3.3	5.0	5.4
Mean number of butterflies	25.7	67.0	60.2
Mean index of diversity of butterflies	0.274	0.425	0.606
Ratio of index of diversity compared with Treatment 1	1.00 : 1	–	2.21 : 1

0 6 . 2

Describe how the scientists calculated the mean species richness of butterflies for each treatment.

[2 marks]

0 6 . 3

Use **Table 2** to calculate the ratio of index of diversity for **Treatment 2** compared with **Treatment 1**.

Give your answer to 3 significant figures.

[2 marks]

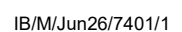
Ratio of index of diversity for **Treatment 2** _____



[4 marks]

[illegible]

10



0 7 . 1

Complete **Table 3** to give three structural differences between an mRNA molecule and a tRNA molecule.

[3 marks]

Table 3

	mRNA molecule	tRNA molecule
1		
2		
3		

Question 7 continues on the next page

Turn over ►



MRSA is a variety of *Staphylococcus aureus* bacteria. It is difficult to treat infections caused by MRSA because it is resistant to some antibiotics.

Scientists compared the effectiveness of a new antibiotic, MC4, with an antibiotic currently used for treatment against MRSA.

The scientists grew samples of MRSA in different conditions:

Sample **A** – with **no** antibiotic

Sample **B** – with the new antibiotic, MC4

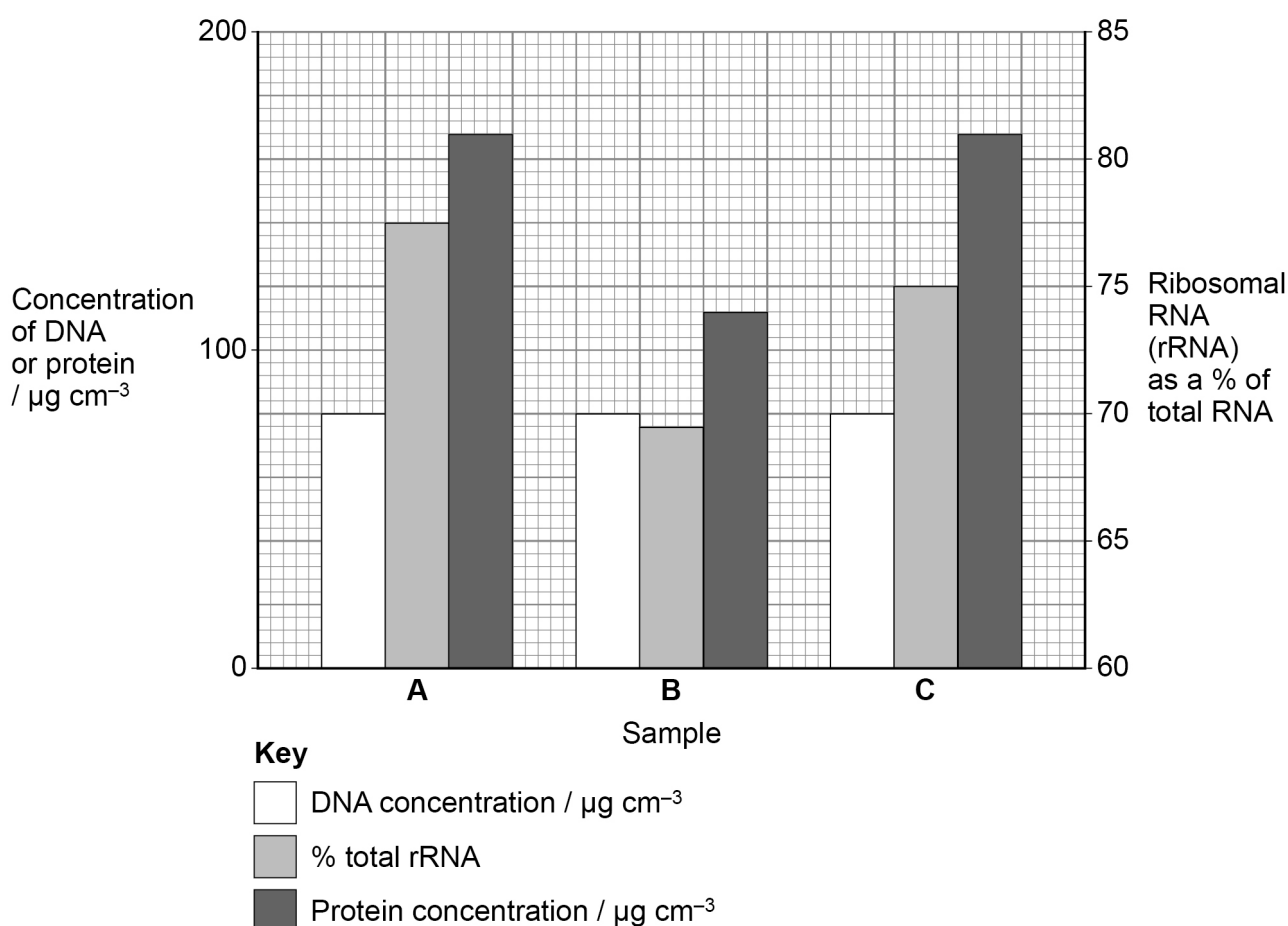
Sample **C** – with the currently used antibiotic.

Then, in each sample, the scientists

- measured the concentrations of protein and DNA
- compared the mass of ribosomal RNA (rRNA) as a percentage of the total mass of RNA.

Figure 7 shows the scientists' results.

Figure 7



07.2

Explain why the scientists grew MRSA with **no** antibiotic added.**[2 marks]**

07.3

The scientists made two conclusions:

- MC4 is more effective against MRSA than the current antibiotic
- MC4 does **not** target DNA replication.

Use **Figure 7** to suggest why each of these conclusions is valid **and** suggest how MC4 acts against MRSA.

[5 marks]



0 8

A student investigated the effect of concentration of lipase on the hydrolysis of lipids.

They were provided with a stock solution of 2.0 mol dm^{-3} lipase and then used distilled water to make solutions of varying concentrations.

0 8**1**

Complete **Table 4** by giving all units and volumes required to make 25 cm^3 of a 1.8 mol dm^{-3} lipase solution.

[2 marks]**Table 4**

Concentration of lipase solution / mol dm^{-3}	Volume of 2.0 mol dm^{-3} lipase /	Volume of distilled water /
	_____	_____
1.8		

The student placed a pH probe into a beaker containing full-fat cow's milk. Then they added the 1.8 mol dm^{-3} lipase solution.

The pH probe was attached to a data logger.

They left the pH probe in place for 5 minutes before reviewing the data.

Table 5 shows some of their results.

Table 5

Time / minutes	pH
0	8.0
1	6.9
2	6.1
3	5.4
4	5.4
5	5.4



0 8 . 2 Explain the results in **Table 5**.

[2 marks]

0 8 . 3 The student repeated the experiment using 0.6 mol dm^{-3} lipase solution.

Suggest **one** similarity and **two** differences between the results obtained using 0.6 mol dm^{-3} , and the results obtained using 1.8 mol dm^{-3} lipase solution.

[3 marks]

Similarity _____

Difference 1 _____

Difference 2 _____

0 8 . 4 Suggest **two** variables that the student should have controlled.

[1 mark]

1 _____

2 _____

Turn over ►



0	8	.	5
---	---	---	---

The student chose to use a pH probe and data logger rather than a pH indicator solution.

Suggest **two** reasons why.

[2 marks]

1 _____

2 _____

10



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0 9

Read the following passage.

Respiratory syncytial virus (RSV) is a common virus, spread by coughs and sneezes. RSV can cause a serious lung infection called bronchiolitis. The symptoms of bronchiolitis are inflamed bronchioles and increased mucus secretion.

Premature babies, very young babies, and old people are at greatest risk from RSV infection. More than 20 babies die from RSV infection in the UK each year. Pregnant women can receive a vaccine to protect themselves and their babies from RSV. Antibodies against the virus are produced and passed to the developing baby across the mother's placenta. The RSV vaccine reduces the risk of severe bronchiolitis by 70% in the first six months of a baby's life. 5 10

Adults aged 75 to 79 can also receive the RSV vaccine. Clinical trials showed the vaccine is safe for pregnant women, their babies and adults over 60. Common side effects of the vaccine include muscle pain, headache and swelling at the site of injection. Most pregnancies last for 40 weeks. In the trials, 2.1% of vaccinated women gave birth before 37 weeks, compared with 1.9% of women in the control group. A nervous system condition that leads to weakness was reported in around five cases for every million doses given. 15

Use the information in the passage and your own knowledge to answer the following questions.

0 9**1**

Respiratory syncytial virus (RSV) is a common virus (line 1).

State **one** structural feature of RSV.**[1 mark]****0 9****2**

Premature babies and very young babies are among those at greatest risk from RSV infection (lines 5–6).

Suggest and explain **two** reasons why.**[2 marks]**

1

2



0 9 . 3

Giving the mother the RSV vaccine reduces the risk of severe bronchiolitis by 70% in the first six months of a baby's life (lines 7–10).

Explain:

- how the risk of severe bronchiolitis is reduced
- why the risk of severe bronchiolitis is reduced for **only** the first six months of the baby's life.

[3 marks]

Risk of severe bronchiolitis is reduced _____

Risk reduced for **only** the first six months _____

Question 9 continues on the next page

Turn over ►



The NHS recommends that all pregnant women and all adults aged 75–79 are vaccinated against RSV.

[4 marks]

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10

END OF QUESTIONS



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