Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2025

Biology

Unit 3 Practical Skills
Booklet B
Foundation Tier

[GBL32]

GBL32

THURSDAY 19 JUNE, MORNING

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in black ink only and use a dark HB pencil for drawings and graphs.
Do not write with a gel pen.
Answer **all seven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is **70**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question **7(b)**.

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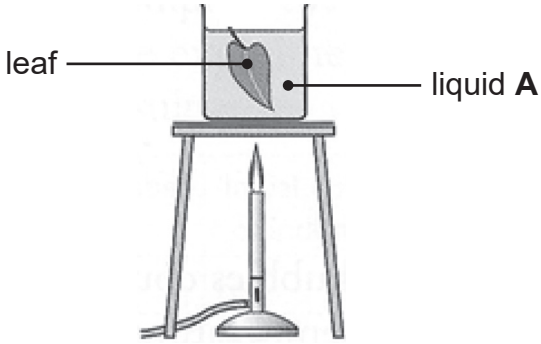
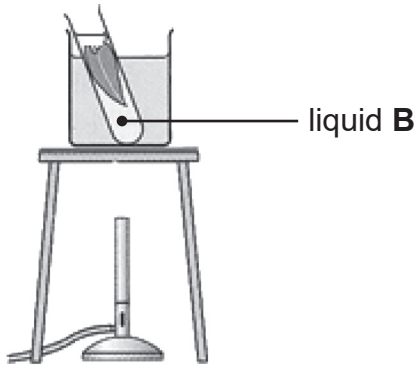
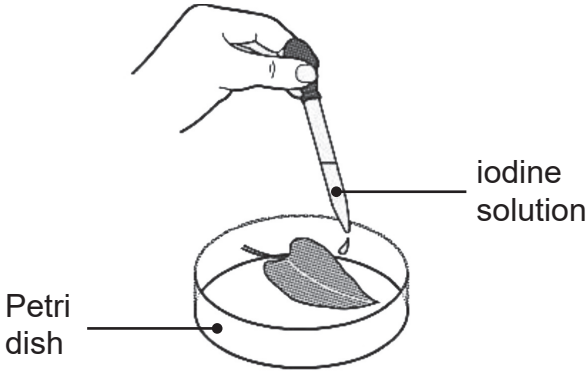
1 **(a)** The diagram shows some steps carried out when testing a leaf for starch.

Step	Diagram	Description
1		Boil leaf in **liquid A**
2		Boil leaf in **liquid B**
3		Test leaf for starch

(i) Name liquids **A** and **B**.

A _____

B _____ [2]

(ii) Explain why **step 1** is carried out.

_____ [1]

(b) Describe what happens to the leaf when it is boiled in **liquid B** and explain why this is necessary.

_____

_____

_____

_____ [2]

(c) **(i)** Describe and explain the safety precaution which is shown in **step 2**.

Description _____

_____

Explanation _____

_____ [2]

(ii) Give **two other** possible hazards when carrying out this experiment and describe how the effect of these hazards could be reduced.

1. _____

_____

_____

2. _____

_____

_____ [4]

[Turn over

2 **(a)** Four pupils measured their pulse rates to investigate the effect of exercise on heart rate.

(i) Suggest **one** part of the body where the pulse could be measured.

_____ [1]

The table shows their results.

Pupil	Heart rate / beats per minute			Recovery time / minutes
	At rest	After exercise	Increase	
A	88	165	77	4
B	62	102	40	1
C	76	121		3
D	82	157	75	2

Look at the table.

(ii) **Complete the table** by calculating the increase in heart rate for **pupil C**.

Show your working.

_____ beats per minute [2]

(b) Give **three** pieces of evidence from the table which show that **pupil A** was the least fit.

No data is required in your answer.

1. _____

_____

2. _____

_____

3. _____

_____ [3]

(c) Give **two** short-term effects of exercise on the heart.

1. _____

_____

2. _____

_____ [2]

(d) Give **two other** effects of exercise on the body.

1. _____

2. _____ [2]

3 **(a)** Bacteria can be cultured on agar jelly.

(i) Suggest what is provided by agar jelly which allows bacteria to grow.

_____ [1]

Before inoculating the agar jelly with bacteria, equipment such as forceps must be sterilised.

(ii) Name the apparatus used to sterilise equipment.

_____ [1]

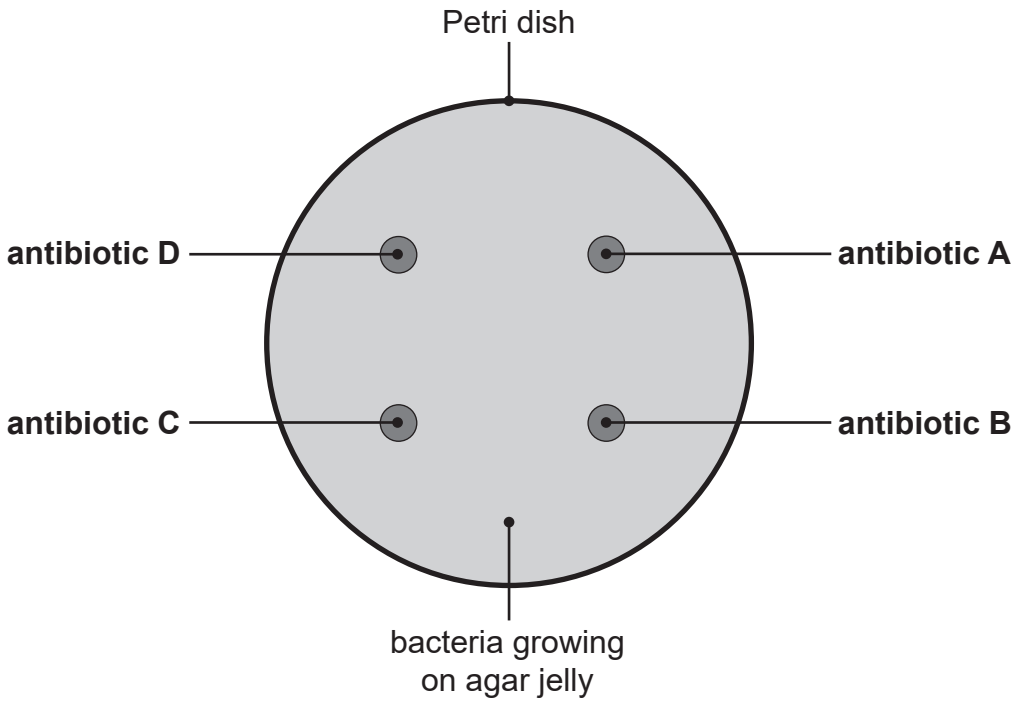
(b) A student investigated the effect of different antibiotics on the growth of bacteria.

She added the bacterial culture to a sterile Petri dish containing agar jelly.

She then added four discs of filter paper, each soaked in a different antibiotic, **A**, **B**, **C** and **D**.

Diagram A shows the experiment she set up.

Diagram A



(i) The student worked beside a lit Bunsen burner when adding the four discs of filter paper to the agar jelly.

Explain why.

_____

_____

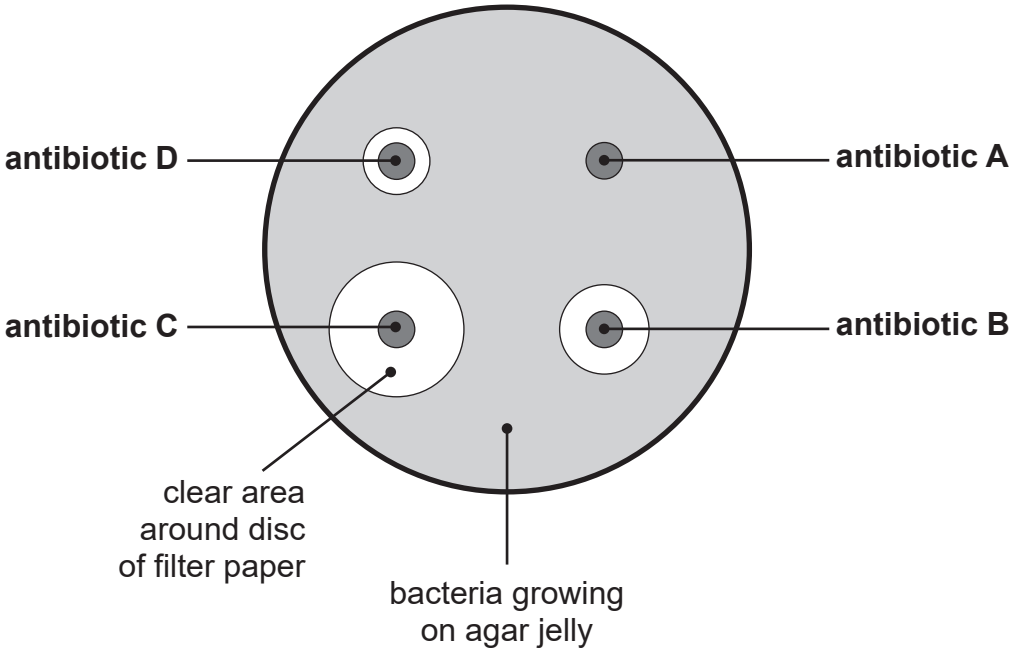
_____

_____ [2]

[Turn over

Diagram B shows the Petri dish after being incubated for 48 hours.

Diagram B



The table shows the diameter of the clear area around each antibiotic.

Antibiotic	Diameter of clear area / mm
A	0
B	12
C	18
D	10

Look at the table.

(ii) Explain why there is a clear area around antibiotics **B**, **C** and **D**.

_____

_____ [1]

(iii) Explain which antibiotic would be least effective in treating an infection caused by this type of bacterium.

_____

_____

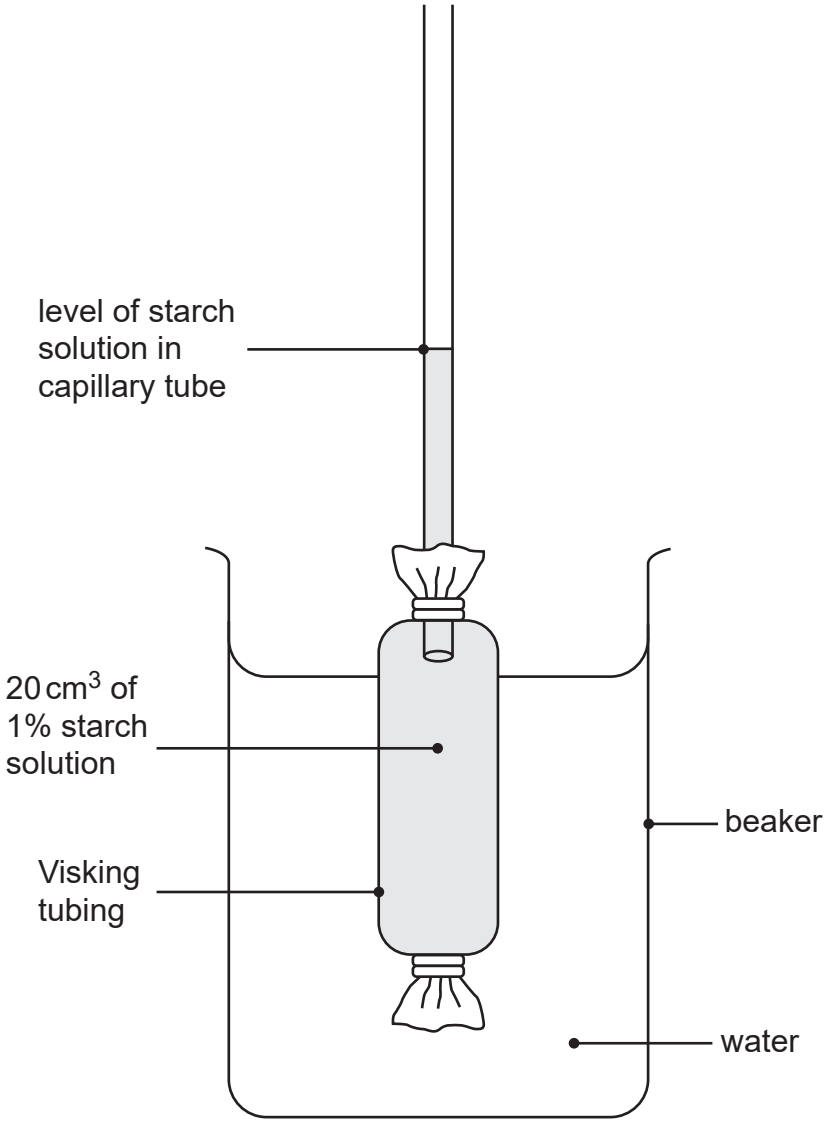
_____

_____ [3]

[Turn over

4 **(a)** The diagram shows apparatus used by a student to demonstrate the movement of molecules across Visking tubing.

Visking tubing is a selectively permeable membrane.



The student filled the Visking tubing with starch solution.

He rinsed the outside of the Visking tubing in water before placing it in the beaker of water.

He left the apparatus for 24 hours.

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Look at the diagram.

(i) Suggest a piece of apparatus the student could have used to measure the volume of the starch solution.

_____ [1]

(ii) After 24 hours, the level of starch solution in the capillary tube had moved up.

Explain why.

_____

_____

_____

_____

_____

_____ [3]

The experiment was repeated using 2% starch solution.

(iii) Suggest **two** ways the results would differ using 2% starch solution compared to 1% starch solution.

1. _____

_____

2. _____

_____ [2]

[Turn over

After 24 hours, the student used iodine solution to test the water in the beaker for starch.

The table shows his results.

Colour of iodine solution	
at the start	**after 24 hours**
yellow-brown	yellow-brown

(b) Use your knowledge of a selectively permeable membrane to explain the result of this test.

_____

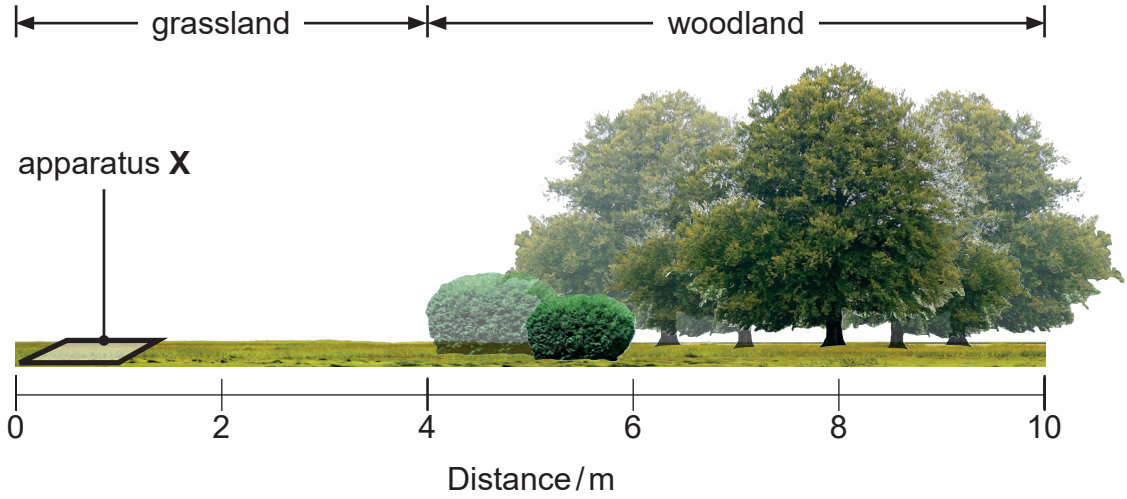
_____

_____

_____ [2]

5 **(a)** A group of pupils sampled the biodiversity of plant species from an area of grassland to an area of woodland.

The diagram shows the area they sampled and some of the apparatus they used.



Look at the diagram.

(i) Name apparatus **X**.

_____ [1]

(ii) Name this method of sampling.

_____ [1]

[Turn over

(iii) Describe how the pupils used this method to sample the biodiversity of plant species in this area.

_____

_____

_____

_____

_____

_____

_____

_____

_____ [4]

(b) The pupils counted the number of plant species and measured the light intensity from the grassland to the woodland.

The table shows their results.

Distance / m	Number of species	Light intensity / lux
0	15	3700
2	14	3700
4	11	3700
6	7	2200
8	5	1200
10	3	1100

Look at the table.

The pupils concluded that the grassland had a greater biodiversity than the woodland.

(i) Explain how they reached this conclusion.

Use **data** from the table to support your answer.

_____

_____

_____

_____ [2]

(ii) The pupils measured the light intensity at ground level. The light intensity at ground level was lower in the woodland than in the grassland.

Suggest why.

_____

_____ [1]

(iii) Explain why this change in light intensity caused a decrease in the growth of plants at ground level in the woodland.

_____

_____ [1]

(c) Give **one biotic factor** and one **other abiotic** factor which can affect biodiversity.

Name the equipment used to measure your named abiotic factor.

Biotic factor _____

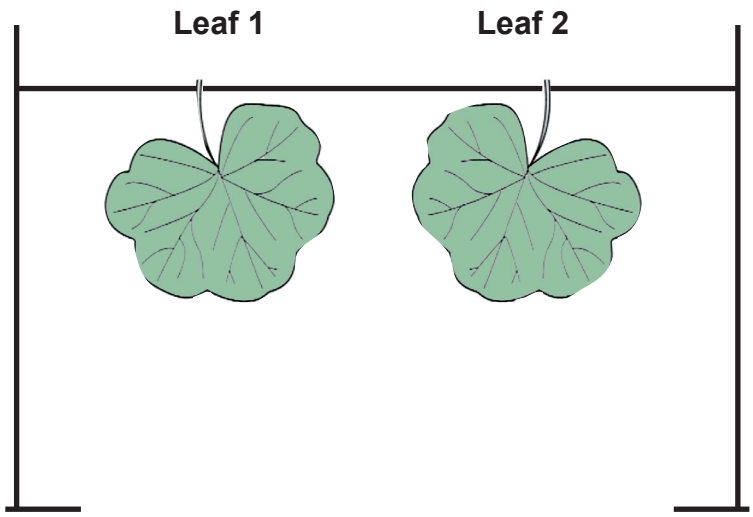
Abiotic factor _____

Equipment _____ [3]

[Turn over

6 **(a)** A group of students carried out an experiment to find out which surface of a leaf loses more water.

The diagram shows the apparatus they used.



The students covered the **lower** surface of **leaf 1** with Vaseline (petroleum jelly).

The students covered the **upper** surface of **leaf 2** with Vaseline (petroleum jelly).

They weighed each of the leaves and hung them up.

After 24 hours, the students re-weighed the leaves.

The table shows their results.

Leaf	Surface covered with Vaseline	Mass / g		Percentage loss in mass
		at start	after 24 hours	
1	lower	1.60		5.0
2	upper	1.70	1.56	8.2

(i) **Complete the table** by calculating the mass of **leaf 1** after 24 hours.

Show your working.

Give your answer to **one decimal place**.

_____ g [4]

(ii) Explain why the two leaves did not need to be the same mass at the start of the experiment.

_____

_____

_____ [1]

There is a greater percentage loss in mass when the upper surface is covered with Vaseline than when the lower surface is covered with Vaseline.

(iii) Explain why.

_____

_____

_____

_____

_____

_____ [3]

[Turn over

(b) The students hung the leaves up in the same conditions and for the same length of time.

(i) Give one **other** variable the students should have controlled in this experiment.

_____ [1]

The students agreed that a control leaf would have improved their experiment.

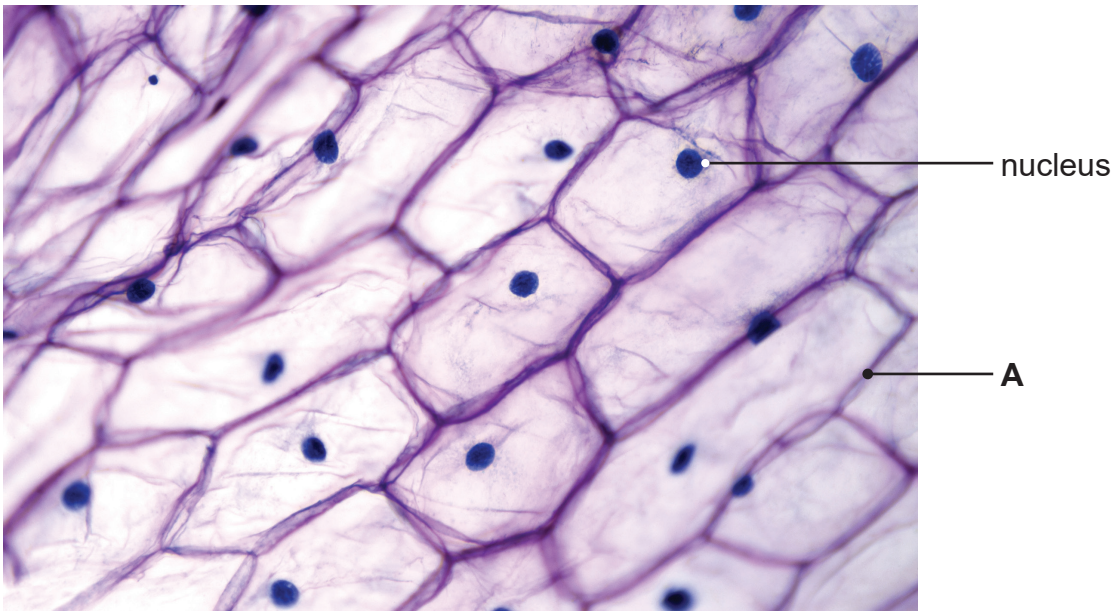
(ii) Suggest a suitable control leaf the students could have included in their experiment.

_____

_____

_____ [1]

7 **(a)** The photograph shows onion cells viewed under a light microscope.



(i) Name part **A**.

_____ [1]

(ii) Describe the function of the nucleus.

_____

_____ [1]

[Turn over

(b) Describe and explain the steps you would carry out to **focus a microscope** to view onion cells at the highest magnification.

Details on how to prepare a slide of onions cells are **not required** in your answer.

In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

[6]

(c) Explain why iodine solution is placed on the onion cells before viewing them using a microscope.

_____

_____

_____

_____ [2]

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SOURCES

Question 1(a): Chief Examiner
Question 3(b): Principal Examiner
Question 4(a): Principal Examiner
Question 5(a): Principal Examiner
Question 6(a): Principal Examiner
Question 7(a): © Getty Images

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
Total Marks	

Examiner Number