Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2022

Biology

Unit 3 Practical Skills
Booklet B
Foundation Tier

[GBL32]

GBL32

MONDAY 27 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. **Do not write with a gel pen.**
Answer **all eight** 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 **6**.

13187

1 **Table 1** gives some information about food tests.

Table 1

Reagent		**Colour of reagent with a positive result**
Iodine solution	yellow–brown	
Benedict's		brick red precipitate
Biuret		lilac/purple
Ethanol	colourless	

(a) Complete the table by adding the missing

- column heading.
- four colours. [5]

(b) Three of the reagents were used to carry out tests on food samples **A**, **B** and **C**.

Table 2 shows the results.

Table 2

Food sample	Results obtained with the reagents		
	Ethanol	Benedict's	Biuret
A	+	–	+
B	+	+	–
C	+	–	+

+ = positive result
– = negative result

Look at the table.

(i) Which **two** food samples contain protein?

_____ and _____ [1]

(ii) Which **one** of the food samples contains both reducing sugar and fat?

_____ [1]

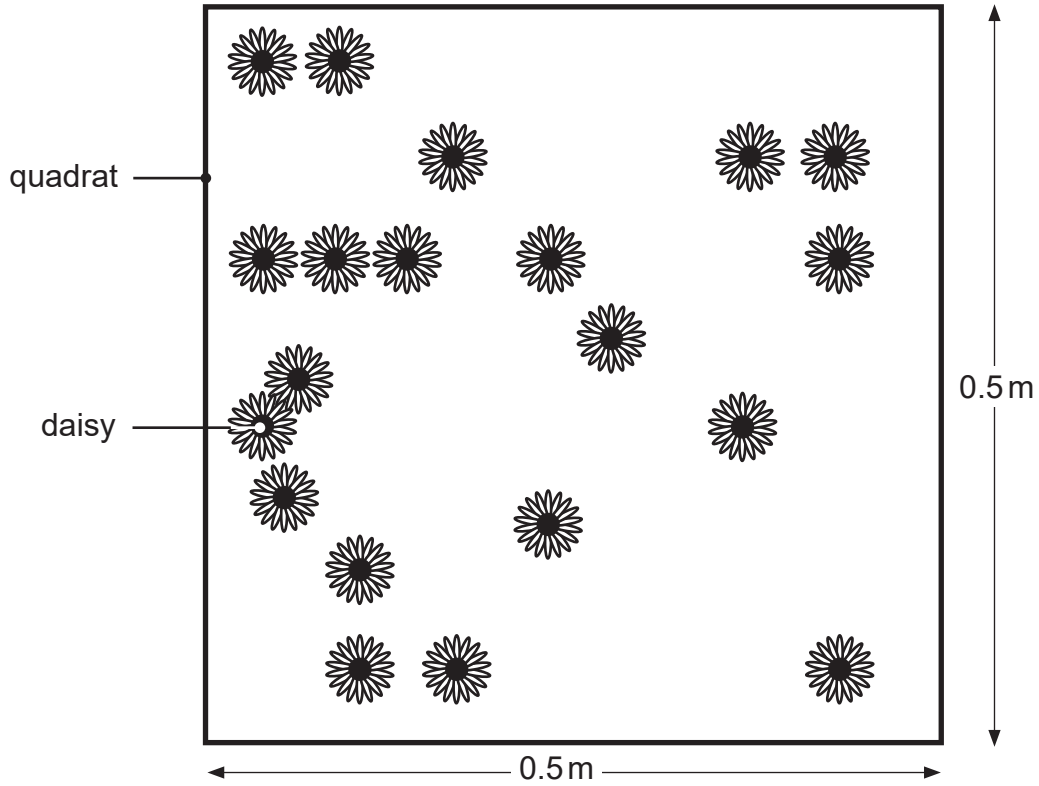
[Turn over

2 A pupil sampled the number of daisies in a field.

(a) What ecological term is used to describe the total number of daisies in a field?

_____ [1]

(b) The diagram shows a quadrat the pupil used to sample the number of daisies.



Look at the diagram.

(i) How many daisies are there in the quadrat?

_____ daisies [1]

The area of the quadrat is 0.25 m^2 (0.5 m × 0.5 m).

(ii) Calculate the number of daisies in 1 m^2.

Show your working.

_____ daisies in 1 m^2 [2]

The area of the field is 600 m^2.

(iii) Calculate the number of daisies in the field.

Show your working.

_____ daisies in the field [2]

(c) The pupil sampled the field 10 times.

(i) Name the method the pupil should have used.

(Circle) the correct answer.

systematic sampling	random sampling	belt transect	[1]

(ii) Explain why the pupil sampled the field 10 times.

_____

_____

_____

_____ [2]

[Turn over

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3 (a) **Photograph 1** shows a slide containing cheek cells being placed onto a light microscope.

Photograph 1

Look at the photograph.

(i) Name part **A**.

_____ [1]

(ii) Name the piece of apparatus that is placed on the microscope slide to prevent the cheek cells drying out.

_____ [1]

[Turn over

(b) Photograph 2 shows two of the cheek cells viewed with the microscope.

Photograph 2

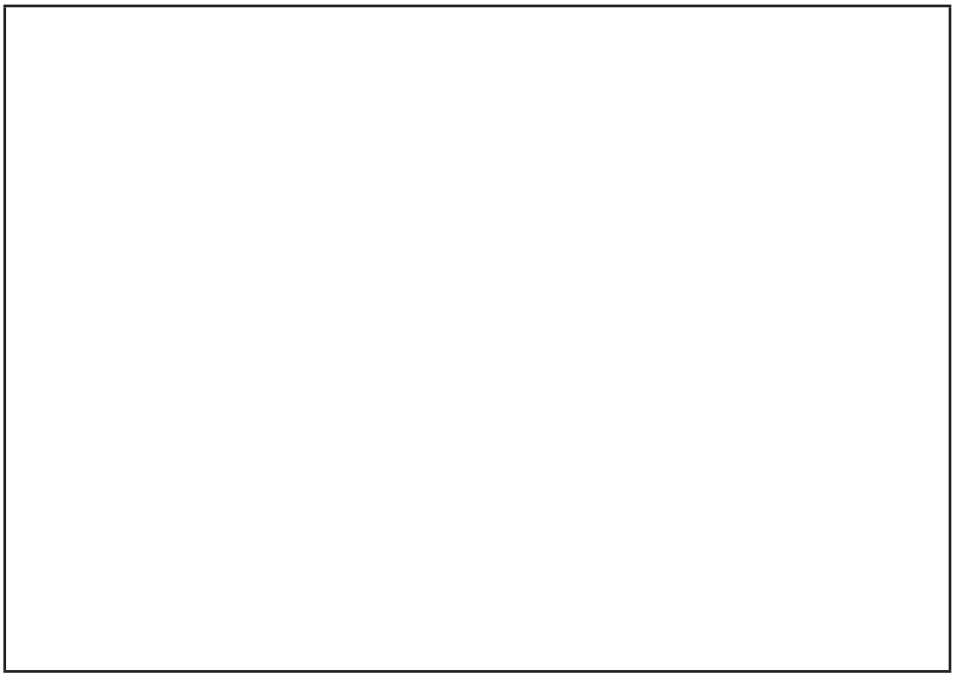
Look at the photograph.

(i) Name parts **B** and **C**.

B _____

C _____ [2]

(ii) Draw the cheek cells from **photograph 2** in the box.



[4]

The cheek cells were viewed by looking through the ×10 objective lens before using the ×40 objective lens of the microscope.

(iii) Give **two** reasons why the ×10 objective lens should be used first.

1. _____

_____

2. _____

_____ [2]

(iv) The cheek cells were stained with blue dye.

Suggest why.

_____

_____ [1]

[Turn over

4 A class of 20 pupils each measured their mass in kilograms (kg).

The results are shown below.

~~40~~ 46 52 48 51 46 45 ~~44~~ 59 48

51 ~~43~~ 50 46 57 54 ~~43~~ 49 52 ~~41~~

The table shows some of their results.

Mass category / kg	Tally	Number of pupils
40–44	𝍸	5
45–49		
55–59		

(a) Complete the results table.

The first row has been completed for you. [4]

Mass is an example of continuous variation.

(b) Give **one other** example of continuous variation in humans.

_____ [1]

Variation can also be **discontinuous**.

(c) Give **two** examples of **discontinuous** variation in humans.

1. _____

2. _____ [2]

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(Questions continue overleaf)

5 **(a)** A student compared the water loss from the leaves of two different plant species.

He weighed two leaves and hung them up in a warm room for 48 hours.

Leaf **A** had a thin waxy cuticle on the upper surface.

Leaf **B** had a thick waxy cuticle on the upper surface.

The student reweighed the leaves after 48 hours.

The table shows his results.

Leaf	Mass of leaf / g		Loss in mass / g	Percentage loss in mass
	at start	after 48 hr		
A	1.44	0.24	1.20	83.3
B	2.89	2.35	0.54	

(i) **Complete the table** by calculating the percentage loss in mass for leaf **B**.

Show your working.

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

[3]

(ii) Explain why it was necessary to calculate the **percentage** loss in mass of the leaves.

_____

_____

_____ [1]

(iii) Describe and explain the difference in the percentage loss in mass of the two leaves.

_____

_____

_____

_____ [2]

(b) The student controlled the light intensity during the experiment.

(i) Suggest how.

_____

_____ [1]

(ii) Describe and explain how increasing the light intensity would affect the loss in mass.

_____

_____

_____ [2]

(iii) Give **two other** factors which the student would have controlled in this investigation.

1. _____

2. _____ [2]

(iv) Suggest a **biotic** factor which the student could not control.

_____ [1]

[Turn over

6 The photograph shows a variegated leaf after it has been tested for the presence of starch.

Source: Principal Examiner

Describe the method used to test a leaf for starch.

Your answer should include a **description** and **explanation** of each step in the method.

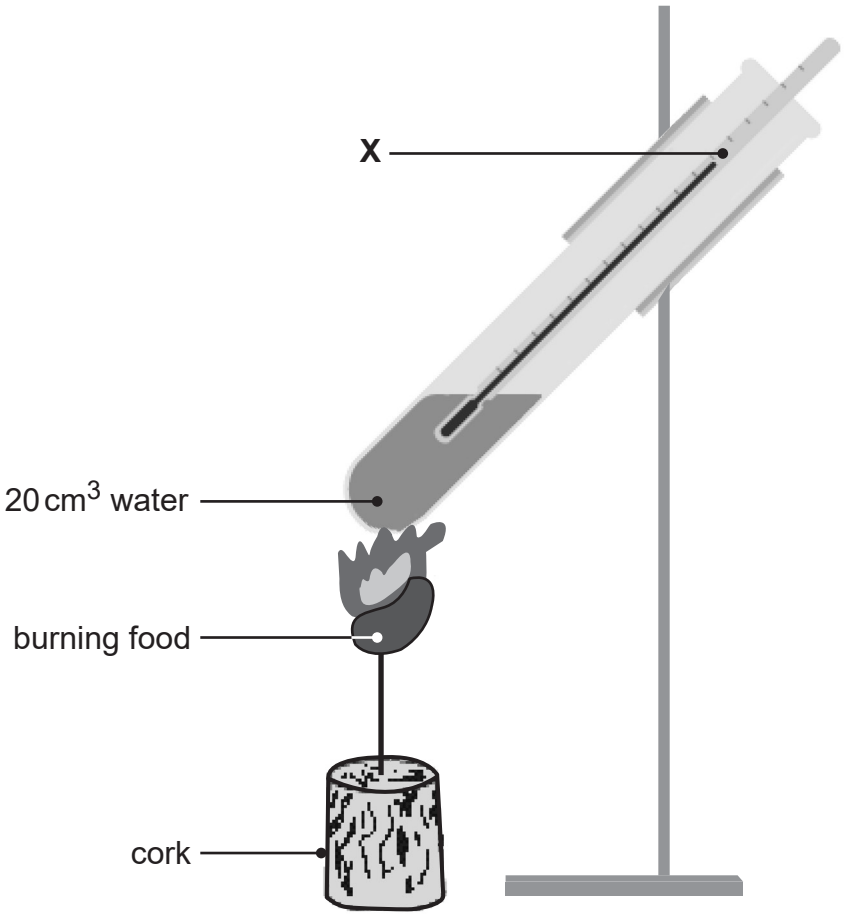
In this question, you will be assessed on your written communication skills and your use of specialist scientific terms.

[6]

[Turn over

7 **(a)** A student carried out an experiment to find out the energy content of three different foods.

The diagram shows the apparatus the student used.



Source: Principal Examiner

Look at the diagram.

(i) Name apparatus **X**.

_____ [1]

(ii) Name the apparatus the student could have used to accurately measure 20 cm^3 of water.

_____ [1]

(b) The table shows the student's results.

Food	Initial temperature of water / °C	Final temperature of water / °C	Change in temperature of water / °C
Biscuit	22	70	48
Bread	22	51	
Pasta	22	45	23

(i) **Complete the table** by calculating the change in temperature of the water when the bread was burned.

[1]

(ii) Give the independent variable in this experiment.

_____ [1]

(iii) The student burned the same mass of each food.

Explain why.

_____

_____ [1]

[Turn over

Fat contains more energy per gram than carbohydrate.

(c) Suggest which of these foods a person on a low fat diet should choose to eat.

Use evidence from the table to help explain your answer.

Food _____ [1]

Explanation _____

_____

_____

_____ [2]

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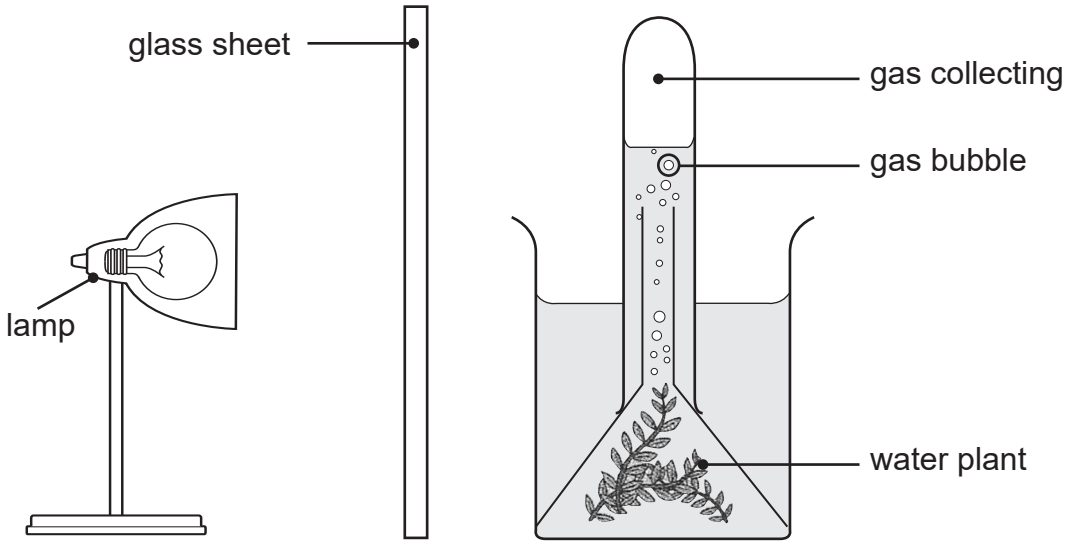
(Questions continue overleaf)

8 **(a)** A group of pupils investigated the effect of light intensity on the rate of photosynthesis.

The diagram shows the apparatus they used.



Source: Chief Examiner

Look at the diagram.

(i) Name the gas collecting in the test tube.

_____ [1]

(ii) Suggest the function of the glass sheet and explain why this is necessary.

_____

_____

_____

_____

_____ [2]

The pupils placed the lamp at different distances from the plant and counted the number of gas bubbles given off by the plant in one minute.

The table shows their results.

Distance of the lamp from the plant / mm	Number of gas bubbles given off in one minute
50	18
100	14
150	9
200	5
250	3

The number of gas bubbles given off in one minute is a measure of the rate of photosynthesis of the plant.

Look at the table.

(b) Describe and explain the trend shown in the results.

_____

_____

_____

_____

_____

_____

_____

_____ [3]

[Turn over

(c) Suggest **two** reasons why counting the number of gas bubbles is **not an accurate** method of measuring the rate of photosynthesis.

1. _____

_____

2. _____

_____ [2]

(d) **(i)** Suggest a suitable control experiment for this investigation.

_____

_____ [1]

(ii) Explain why this control experiment is necessary.

_____

_____ [1]

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
Total Marks	

Examiner Number