Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2022–2023

Double Award Science: Biology

Unit B1

Foundation Tier

[GDW11]

GDW11

TUESDAY 16 MAY 2023, 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

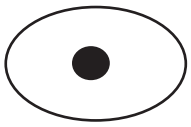
The total mark for this paper is 60.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question **8(b)(ii)**.

13666.06**R**

1 The cells of multicelled organisms can form specialised tissues, organs, and organ systems.

Use answers from the box to write the level of organisation shown by each diagram. Each answer may be used once, more than once, or not at all.

cell	tissue	organ	organ system	organism



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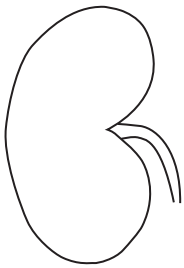

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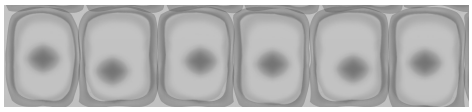

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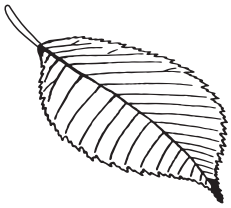

_____ [5]

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(Questions continue overleaf)

[Turn over

2 The following sentences are about mammalian respiratory surfaces.

(a) Complete these sentences by writing the correct word in each blank space.

The presence of many alveoli (air sacs) provide a

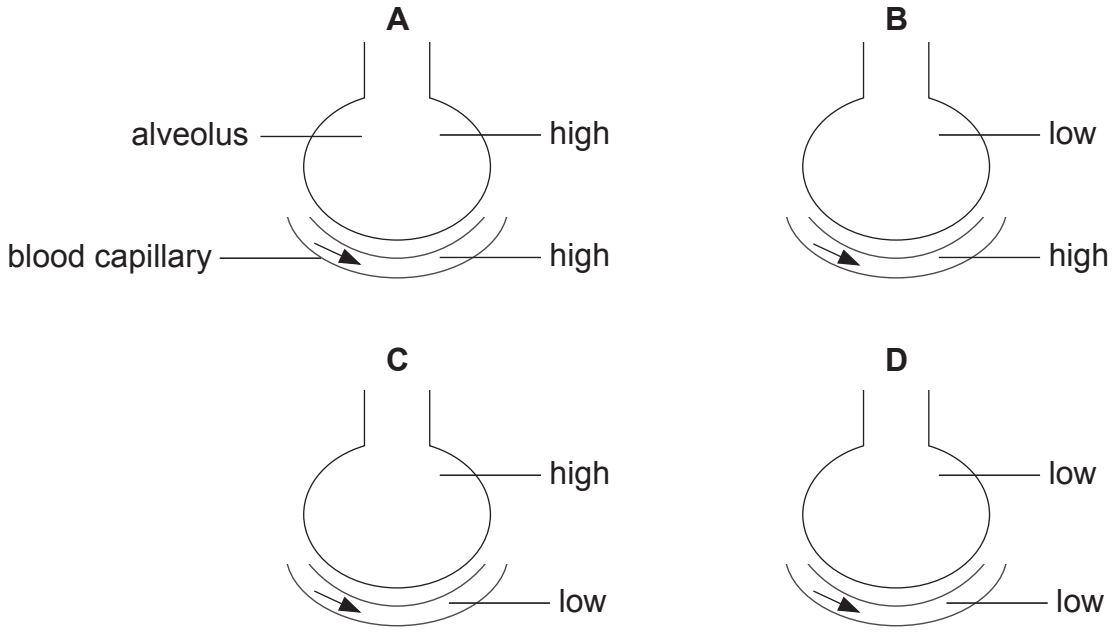
_____ _____

_____ for gas exchange.

The walls of alveoli and blood capillaries are _____

to allow gases to diffuse through them. [2]

(b) The diagrams show possible concentrations of oxygen and carbon dioxide in the alveoli in the lungs and the blood capillaries during inspiration and expiration.



(i) Choose the letter of the diagram, **A**, **B**, **C** or **D**, that shows the correct diffusion gradient for **oxygen** during **inspiration**.

_____ [1]

(ii) Choose the letter of the diagram **A**, **B**, **C** or **D**, that shows the correct diffusion gradient for **carbon dioxide** during **expiration**.

_____ [1]

(c) **(i)** Respiration takes place in all cells.
What is the function of respiration in cells?

_____

_____ [1]

(ii) Mammalian muscles switch to anaerobic respiration when oxygen supply is limited.

Name the substance produced in anaerobic respiration in muscles.

_____ [1]

[Turn over

3 The names of some biological molecules are given in the box.

starch	cellulose	glucose
carbohydrase		glycerol
lactose	amylase	glycogen

The table gives three types of biological molecules.
Use the names of the biological molecules in the box to complete the table correctly.
One of the names will not be used.

Simple carbohydrate	Complex carbohydrate	Protein
_____	_____	_____
_____	_____	_____
	_____	

[7]

4 The two communication systems in the human body are the nervous system and the hormonal system.
Terms relating to these two systems are given in the table.

Term	Letter
electrical	**A**
slow	**B**
brain	**C**
muscles	**D**
spinal cord	**E**
chemical	**F**
fast	**G**
unconscious	**H**
glands	**I**

Complete the table to give the letters of the **two terms** that complete each sentence.
Letters may be used once, more than once, or not at all.

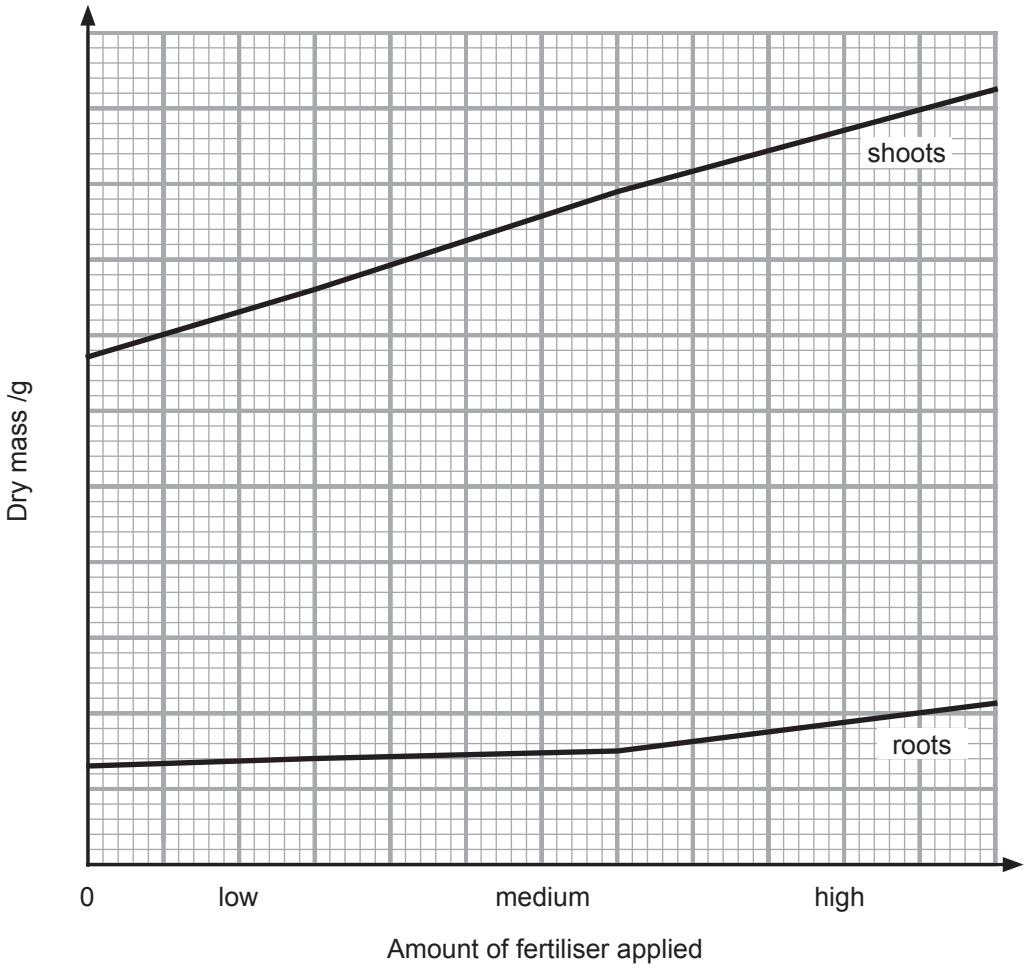
	Letters of terms
The Central Nervous System (CNS) is made up of	the _____ and _____ .
The nervous system	uses _____ messages and produces a _____ response.
The hormonal system	uses _____ messages and produces a _____ response.
A reflex action produces	a _____ and _____ response.

[8]

[Turn over

5 Fertiliser contains minerals that plants can absorb from the soil.
The dry mass of roots and shoots of sweetcorn plants varies with the amount of fertiliser added to the soil that the sweetcorn plants are growing in.

The graph shows the dry mass of sweetcorn roots and shoots when different amounts of fertiliser are applied.



(a) Suggest why the roots and shoots of the sweetcorn grew when **no** fertiliser was added to the soil.

_____

_____ [1]

(b) Give **one** similarity and **two** differences in the trends for the dry mass of roots and shoots of the sweetcorn plants when different amounts of fertiliser are applied.

Similarity

_____

_____

Differences

1. _____

_____

_____

2. _____

_____

_____ [3]

(c) Explain how an increase in the amount of fertiliser causes the change in the dry mass of roots and shoots of the sweetcorn plants.

_____

_____

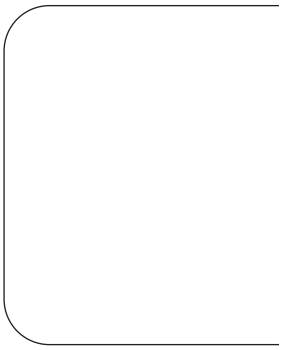
_____ [2]

[Turn over

6 Root hair cells are specialised cells found in plants.

(a) Complete the diagram by drawing:

- the rest of the outline of a root hair cell.
- the other structures found in a root hair cell.



[3]

(b) Name the structures present in leaf palisade cells that are **not** present in root hair cells.

_____ [1]

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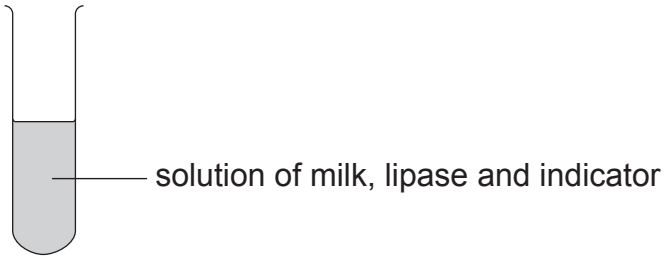
[Turn over

7 A student investigated the action of the enzyme lipase on milk at different temperatures.
Milk has an alkaline pH.
When lipase breaks down fat in milk, the milk becomes acidic.
The student used an indicator which is pink in alkaline conditions and colourless in acidic conditions.

The diagram shows one of the boiling tubes the student used in the investigation.

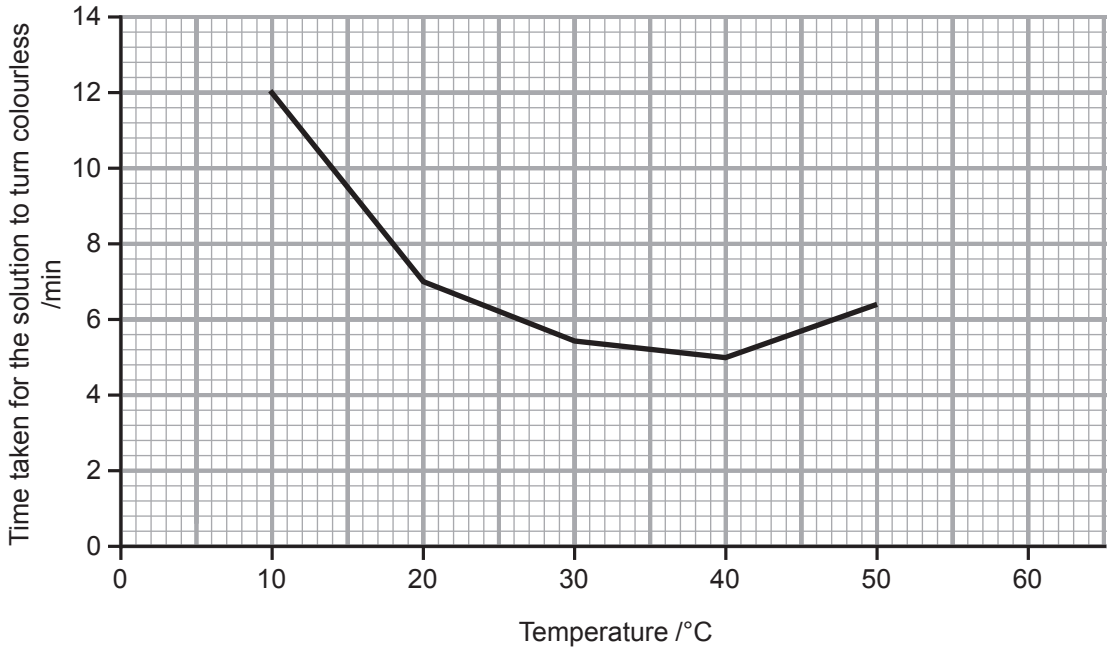


(a) Name the substance produced by the break down of fat in the milk that caused the **pH** of the solution in the boiling tube to become acidic.

_____ [1]

The student recorded the time taken for the solution of milk, lipase and indicator to turn colourless at different temperatures.
The student used the same volume of milk and the same volume and concentration of lipase in each boiling tube.

The graph shows the student's results.



(b) Use the graph to describe the overall trend between 10 °C and 40 °C.
Give data for 10 °C and 40 °C to support your answer.

[2]

(c) **(i)** Use a ruler to extend the line on the graph between 50 °C and 60 °C. [1]

(ii) Use the line you have drawn to give the time for the solution to turn colourless at 60 °C.

minutes [1]

(d) The student repeated the experiment at 80 °C.
The solution did **not** turn colourless. Explain why.

[4]

[Turn over

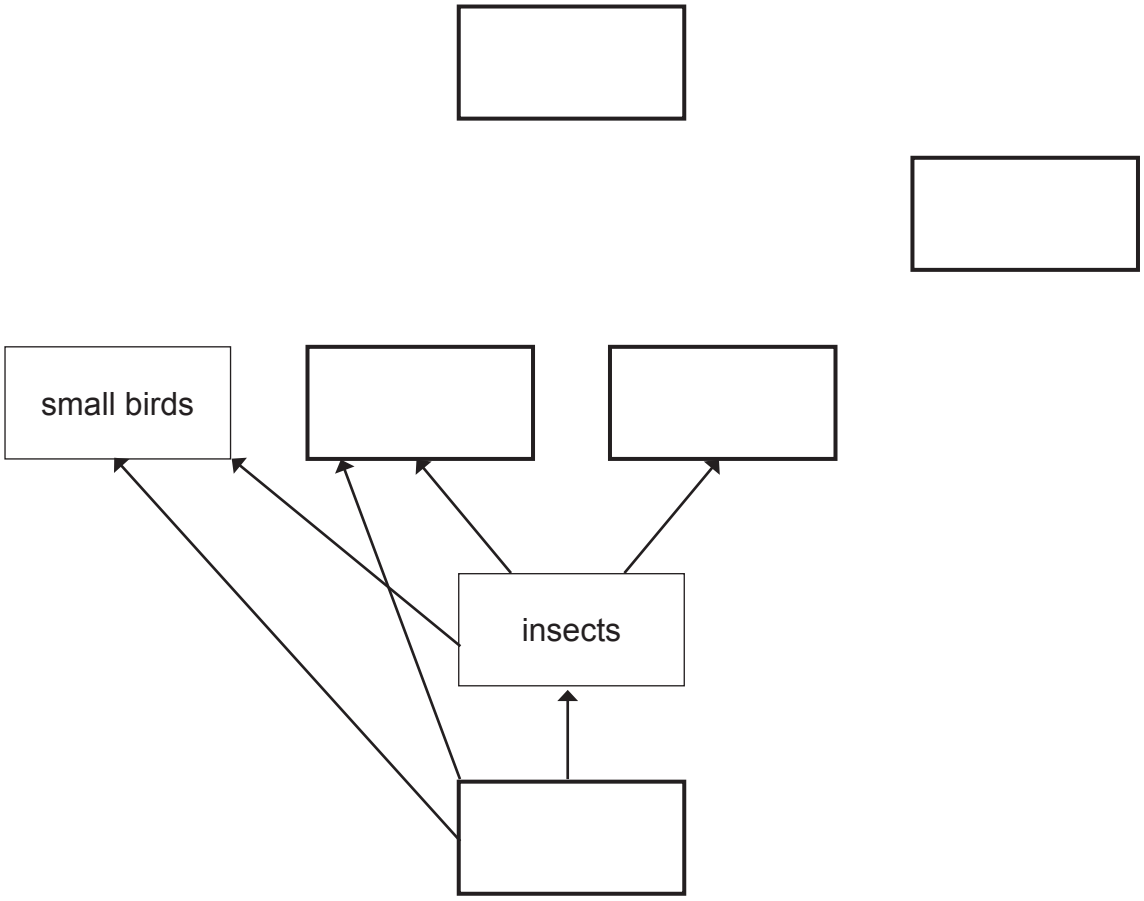
8 Marsh Harriers are wild birds of prey that live in marshlands in the United Kingdom (U.K.).

The photograph shows a Marsh Harrier.

The statements below give information about the Marsh Harrier and some other organisms in its food web.

Insects eat plants (including crop plants).
Mice eat plants and insects.
Frogs eat insects.
Reptiles eat frogs, insects and mice.
Marsh Harriers eat mice, small birds, insects, reptiles and frogs.

(a) Use the statements to complete the food web.
Add the names of the organisms into the empty boxes.
Add arrows to show the direction of energy flow between the organisms.



[4]

[Turn over

(b) Measures were put in place between 2000 and 2016 in the U.K. to increase the Marsh Harrier population.

In 2000 there were 302 Marsh Harriers.
In 2016 there were 1286 Marsh Harriers.

(i) Calculate the percentage (%) increase in the number of Marsh Harriers from 2000 to 2016.

Show your working.
Give your answer to the nearest whole number.

_____ % [4]

Two of the measures taken to increase the number of Marsh Harriers in the U.K. were as follows:

Measure 1. Banning the use of pesticides.
- Pesticides kill insects that eat plants.
- They also can damage the shells of Marsh Harrier eggs.

Measure 2. Stopping the draining of some areas of land.
- Draining land destroys areas of marshland.

(ii) Use **all** the information given to suggest how the measures taken resulted in an **increase** in the Marsh Harrier population in the U.K.

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

Measure 1. Banning the use of pesticides.

Measure 2. Stopping the draining of some areas of land.

[6]

(c) Hunting of Marsh Harriers was also banned.
Suggest how this measure brought about an increase in the Marsh Harrier population over this period of time.

[1]

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Question Number	**Marks**
1	
2	
3	
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5	
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7	
8	
Total Marks	

Examiner Number

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