Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2022

Biology

Unit 1
Foundation Tier

[GBL11]

GBL11

TUESDAY 17 MAY, MORNING

TIME

1 hour 15 minutes.

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 eleven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is **75**.
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)**.

13014

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1 Humans are multicellular organisms.

Multicellular organisms are made up of many cells.

(a) Complete the diagram which shows how cells are organised in a multicellular organism.

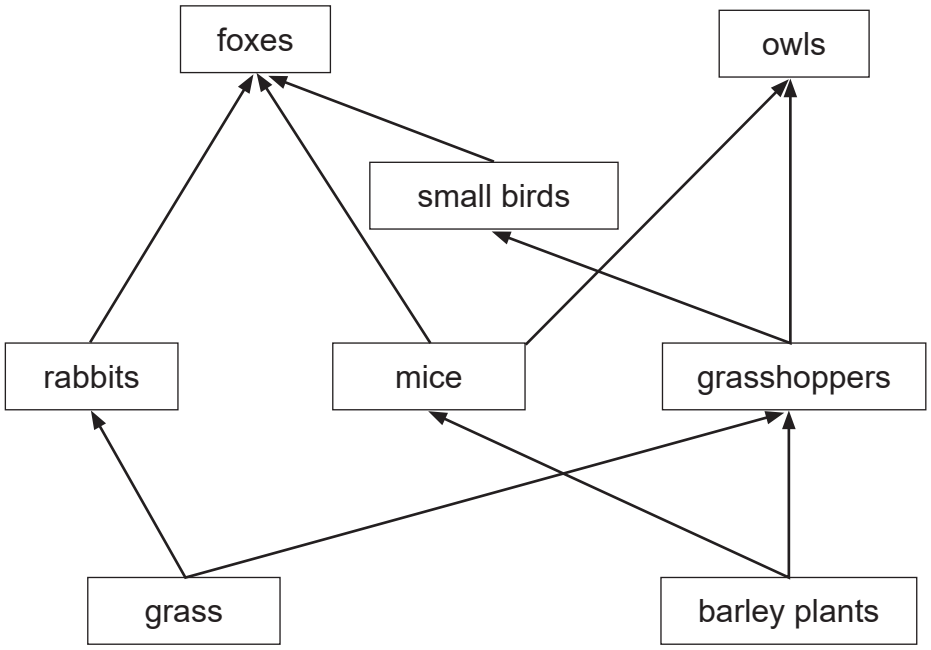
[2]

(b) Name **two** organ systems found in humans.

1. _____

2. _____ [2]

2 The diagram shows a food web.



Look at the diagram.

(a) Complete the food chain from this food web.

barley plants			foxes

[2]

(b) Name an animal which feeds at **two** different trophic levels in this food web.

_____ [1]

(c) Suggest why the number of mice may decrease if a disease killed the rabbits.

_____

_____

_____

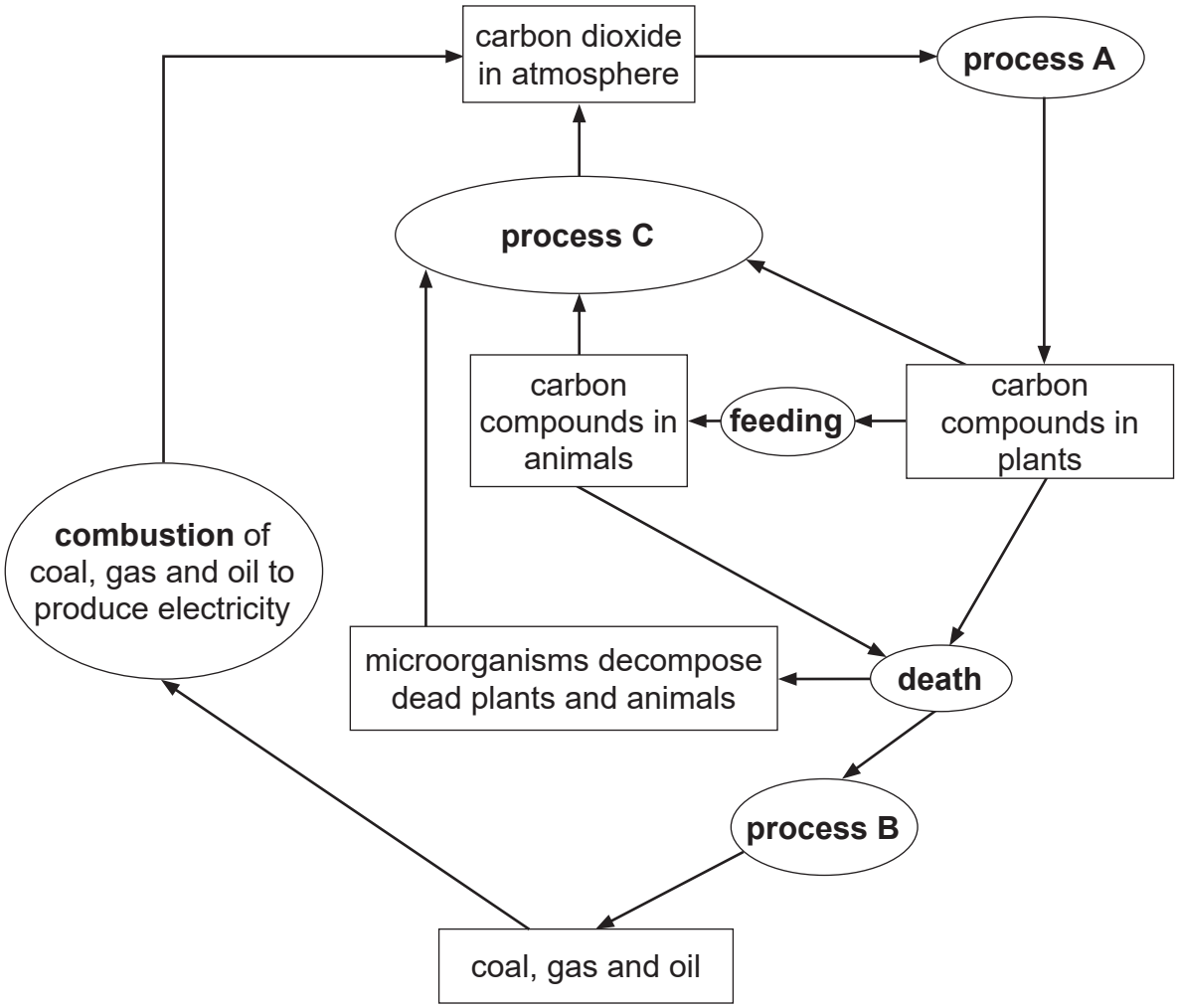
_____ [2]

(d) Give the source of energy for a food web.

_____ [1]

[Turn over

3 The diagram shows some processes in the carbon cycle.



Look at the diagram.

(a) Name processes **A**, **B** and **C**.

A _____

B _____

C _____ [3]

Wind turbines have large blades which move when wind hits them.

The movement of the blades produces electricity.

The photograph shows five wind turbines which are part of a wind farm.

(b) Describe and explain how the use of wind farms affects the level of carbon dioxide in the atmosphere.

Use the diagram of the carbon cycle to help you.

_____

_____

_____

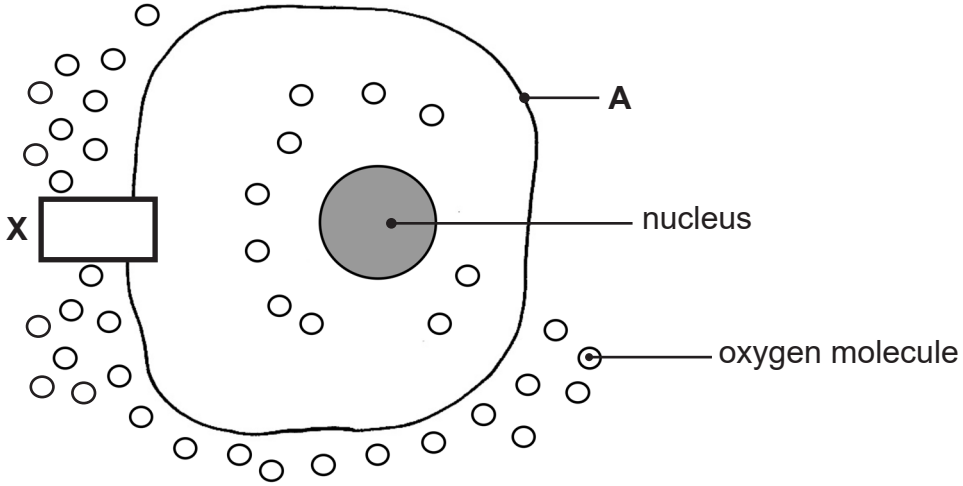
_____

_____

_____ [3]

[Turn over

4 The diagram shows oxygen molecules inside and outside an animal cell.



Look at the diagram.

(a) Name part **A**.

_____ [1]

Oxygen molecules move by **diffusion**.

(b) **Draw an arrow in box X** to show the direction the oxygen molecules will move by diffusion. [1]

(c) Explain why the oxygen molecules diffuse in this direction.

_____

_____ [1]

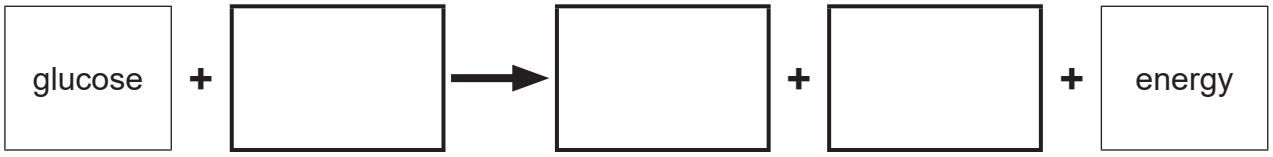
(d) Give **two** ways the rate of diffusion of molecules can be **increased**.

1. _____

2. _____ [2]

5 **(a)** Human cells obtain energy from respiration.

(i) Complete the word equation for **aerobic** respiration.



[3]

(ii) Suggest **two** ways human cells use the energy released during aerobic respiration.

1. _____

2. _____ [2]

During strenuous exercise human muscle cells can respire **anaerobically**.

(b) Give **two** ways anaerobic respiration differs from aerobic respiration in human muscle cells.

1. _____

_____

2. _____

_____ [2]

[Turn over

6 **(a)** **(i)** Give **one similarity** between the nervous system and the hormonal system.

_____

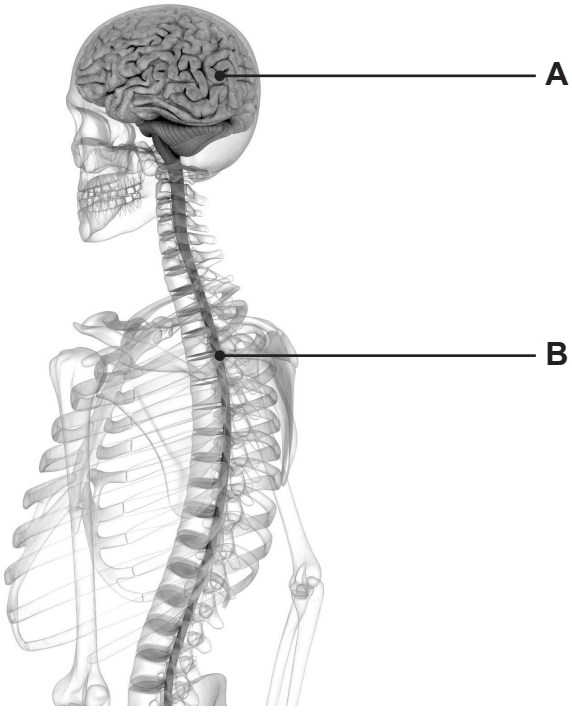
_____ [1]

(ii) Complete the table to show the **differences** between the nervous system and the hormonal system.

System	Type of signal	Speed of response
Nervous		
Hormonal	chemical	

[2]

(b) The diagram shows the central nervous system.



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Look at the diagram.

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

A _____

B _____ [2]

The central nervous system coordinates stimuli and responses.

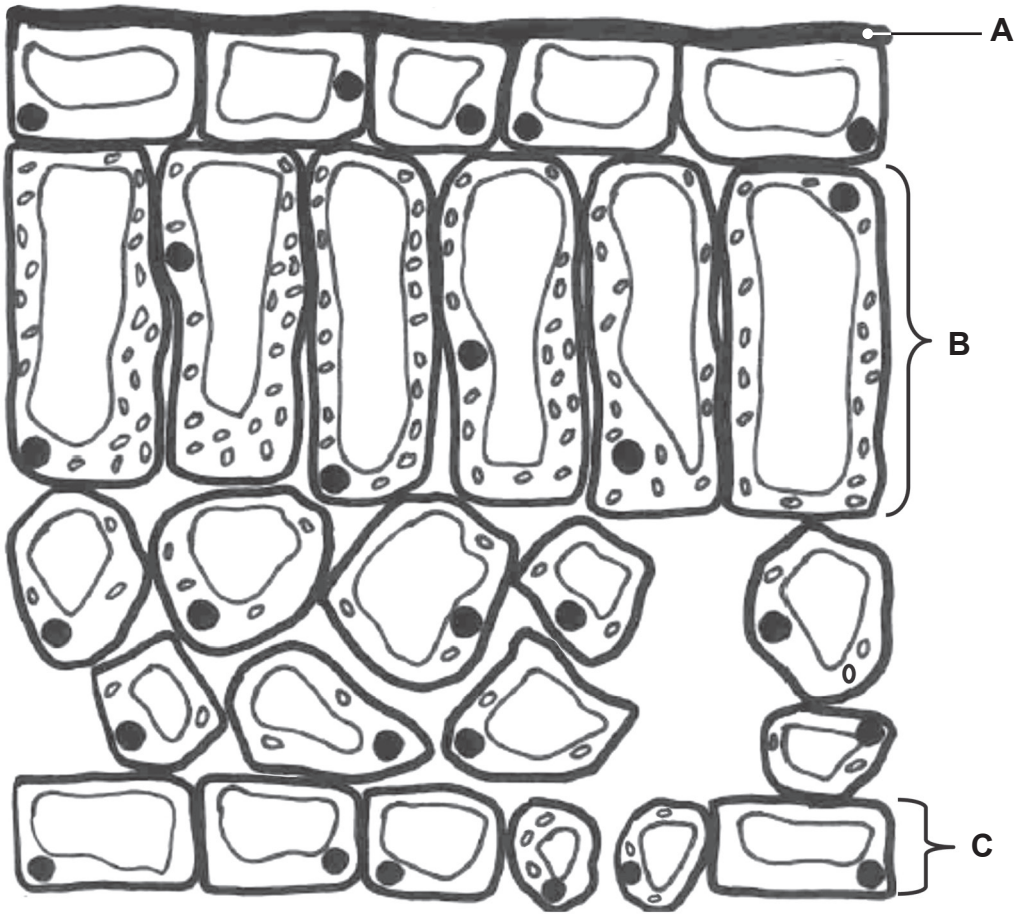
When a person smells food cooking, the salivary glands in their mouth produce saliva and the person feels hungry.

In this example, the stimulus is the smell of the food cooking.

(ii) Name the effector in this example.

_____ [1]

7 **(a)** The diagram shows a cross section through a leaf.



Source: Principal Examiner

Look at the diagram.

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

B _____

C _____ [2]

(ii) Give the function of layer **A**.

_____ [1]

(b) Describe and explain **three** ways leaves are adapted for photosynthesis.

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

[6]

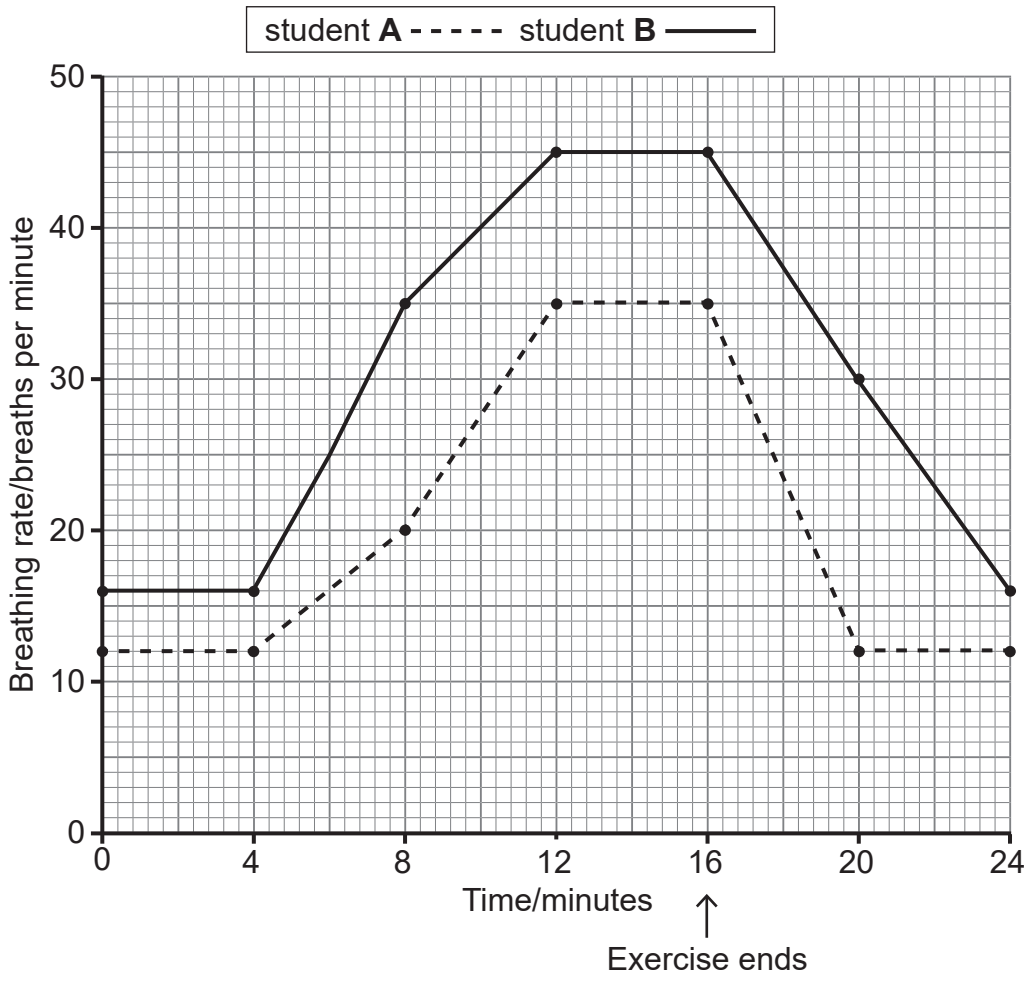
[Turn over

8 A scientist investigated the effect of exercise on the breathing rate of two students.

The students did the same type of exercise for the same length of time.

The scientist measured the breathing rate of each student every four minutes before, during and after exercise.

The graph shows the results.



13014

Look at the graph.

(a) Suggest at what time the exercise starts.

Explain your answer.

Time _____ minutes [1]

Explanation _____

_____ [1]

(b) The scientist compared the resting breathing rates of the two students.

She concluded that student **A** was fitter than student **B**.

(i) Give the resting breathing rates of the two students.

Student **A** _____ breaths per minute.

Student **B** _____ breaths per minute. [2]

(ii) Describe **two other** ways the results suggest that student **A** is fitter than student **B**.

Give **data** from the graph to support your answer.

1. _____

_____

_____

2. _____

_____

_____ [4]

[Turn over

(c) Give **one other** way the students' breathing may have been affected by the exercise.

_____

_____ [1]

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(Questions continue overleaf)

9 A group of students estimated the percentage cover of five plant species in two different areas of their school grounds.

One area was in direct sunlight and the other was in the shade.

(a) Name the apparatus the students used to estimate the percentage cover of the plant species.

_____ [1]

Table 1 shows the students' results.

Table 1

Plant species	Percentage cover	
	Area A	Area B
grass	65	63
moss	9	26
daisies	7	2
buttercups	7	4
plantain	12	5

Look at **Table 1**.

The students concluded that the biodiversity was the same for both areas of the school grounds.

(b) Give **one** piece of evidence from **Table 1** to explain how they reached this conclusion.

_____

_____

_____ [1]

The students also measured three abiotic factors in the two different areas of the school grounds.

Table 2 shows the students' results.

Table 2

Area	Abiotic factor		
	light intensity / %	soil pH	soil temperature / °C
A	84	6.0	17
B	60	6.0	13

Look at **Table 1** and **Table 2**.

(c) Suggest which plant species is best adapted to low light intensity compared to high light intensity.

Use evidence from both tables to support your answer.

_____

_____

_____

_____ [2]

(d) Suggest **one** other abiotic factor which would differ in the two areas.

_____ [1]

[Turn over

10 (a) Farmers apply fertiliser to soil used to grow crops.

Fertiliser adds minerals to the soil which increase crop yield.

Minerals in the soil are used by plants.

(i) Name the cells in a plant which take up minerals from the soil.

_____ [1]

(ii) Name the process used by these cells to take up minerals from the soil.

_____ [1]

(iii) Give **one** way these cells are adapted to take up minerals from the soil.

_____

_____ [1]

(b) A scientist carried out an investigation to find the best mass of fertiliser to apply to a crop.

He sowed the same number of oat seeds in each of six equal-sized plots.

Plot 1 had no fertiliser applied.

Plots 2 to 6 had different masses of the same fertiliser applied.

He recorded the yield of the oat crop in each plot after 6 months.

The table shows his results.

Plot	Mass of fertiliser applied / kg	Yield of oat crop / kg
1	0	50
2	20	120
3	40	150
4	60	170
5	80	180
6	100	180

Look at the table.

(i) Calculate the percentage change in yield of oat crop when the mass of fertiliser applied was increased from 20 to 80 kg.

Show your working.

_____ % [3]

(ii) Describe the trend shown in the scientist's results.

_____

_____

_____ [2]

(iii) The oat crop was able to grow in plot 1 even though no fertiliser was applied.

Suggest why.

_____

_____ [1]

(iv) Fertilisers are expensive.

Explain why a farmer should not apply 100 kg of fertiliser to his oat crop.

_____

_____

_____

_____ [2]

[Turn over

11 **(a)** Dead leaves are decomposed by fungi.

(i) What term is used to describe decomposers such as fungi?

_____ [1]

(ii) Describe how fungi feed on dead leaves.

_____

_____

_____

_____

_____

_____

_____

_____ [3]

(b) A student investigated two conditions needed for the decomposition of dead leaves.

She weighed the leaves and then left them in different conditions for 28 days.

She reweighed the leaves and calculated the percentage mass **remaining**.

The table shows her results.

Temperature / °C	Water available for decomposers	Percentage mass of leaves remaining
10	low	82
10	high	62
30	low	76
30	high	38
60	low	86
60	high	86

(i) Use evidence from the table to give the best conditions for the decomposition of dead leaves.

Explain your choice.

_____

_____

_____

_____

_____

_____ [2]

(ii) Suggest an explanation for the results at 60°C.

_____

_____ [1]

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For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
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10	
11	
Total Marks	

Examiner Number