Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2017

Biology

Unit 1
Foundation Tier

[GBY11]

GBY11

FRIDAY 9 JUNE, MORNING

TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

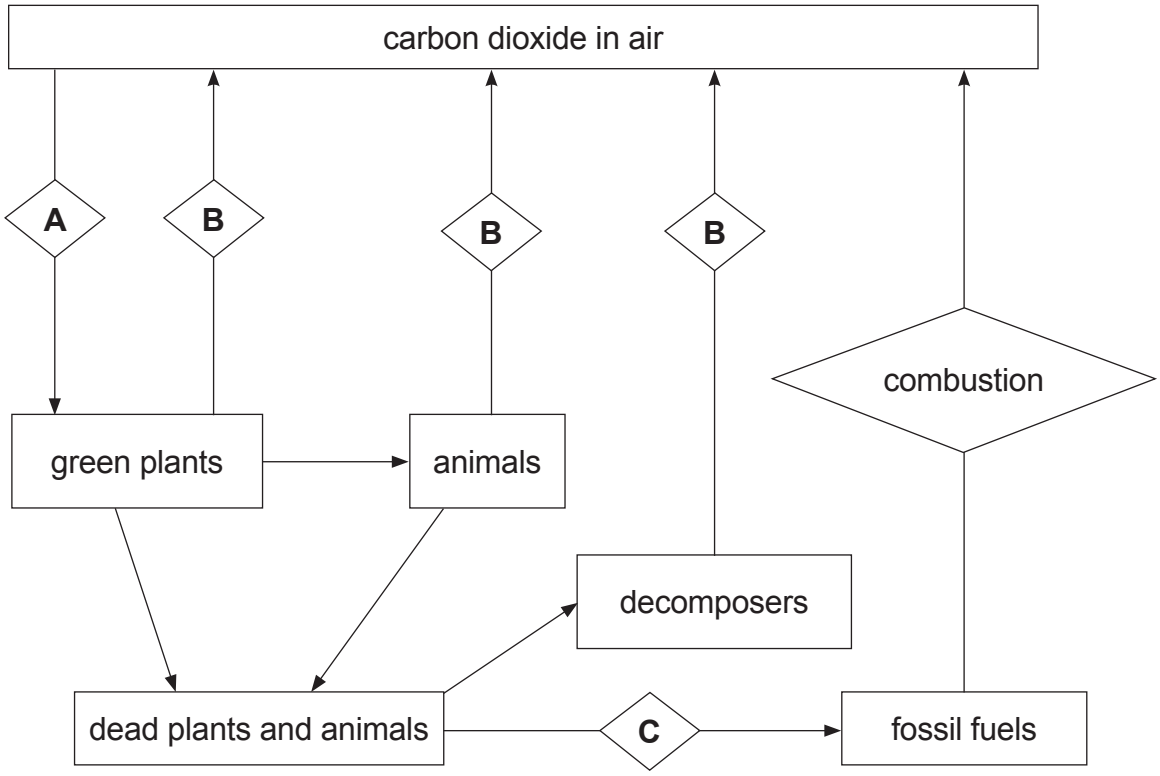
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all twelve** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 80.
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 **12**.

10400

1 The diagram shows the carbon cycle.



Look at the diagram.

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

Choose your answers from the words in the box.

excretion	**feeding**	**fossilisation**	**photosynthesis**	**respiration**

A _____ [1]

B _____ [1]

C _____ [1]

(b) Decomposers break down dead plants and animals.

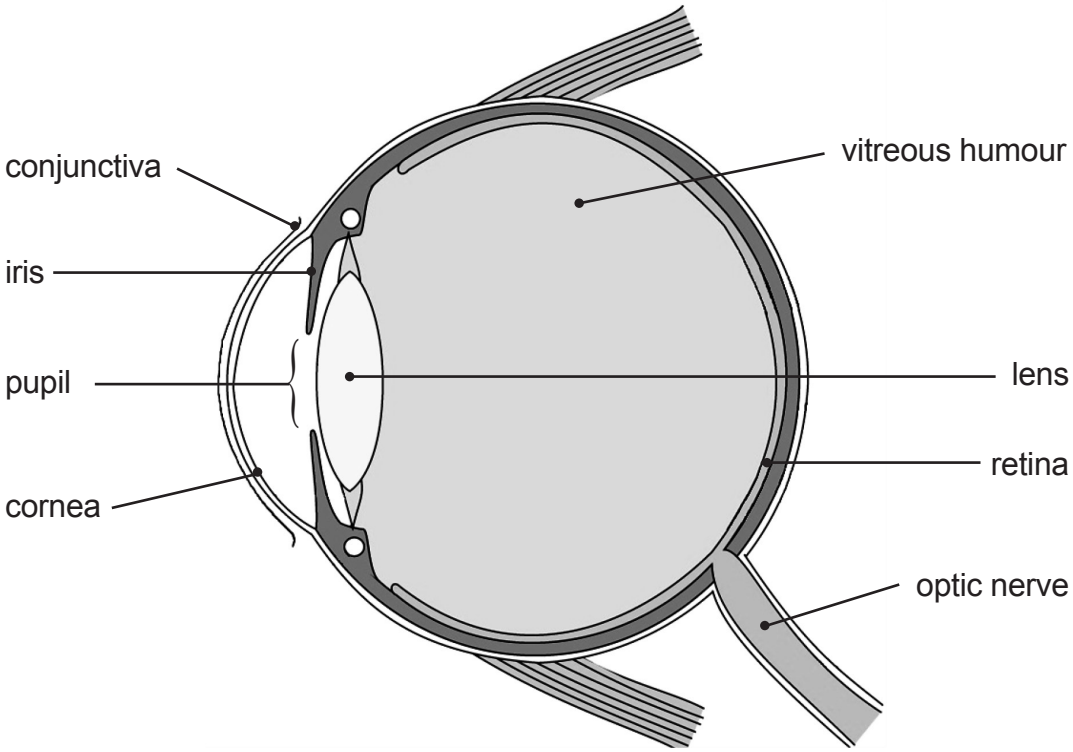
Name **one** type of organism that is a decomposer.

Draw a (circle) around the correct answer.

insects **fungi** **molluscs** [1]

[Turn over

2 The diagram shows parts of the eye.



Source: CCEA

Look at the diagram.

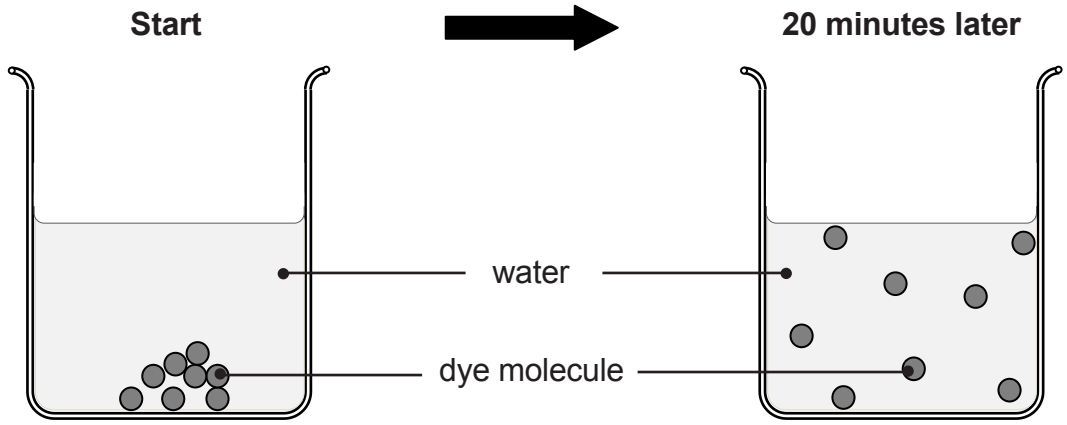
Complete the table by choosing the part of the eye which matches its function.

Part of the eye	Function
	carries information to the brain
	controls the size of the pupil
	thin outer covering which protects front of the eye
	contains light-sensitive cells

[4]

3 A drop of dye was placed in a beaker of water.

The diagram shows the movement of the dye molecules.



Look at the diagram.

(a) **Complete the sentences** describing the movement of the dye molecules in the water over 20 minutes.

Choose your answers from the words in the box.

low	**evaporation**	**water**	**high**	**diffusion**	**randomly**

The dye molecules move by _____ .

The dye molecules moved from an area where they were in a _____

concentration to where they were in a _____ concentration.

At twenty minutes the dye molecules were _____ spread. [3]

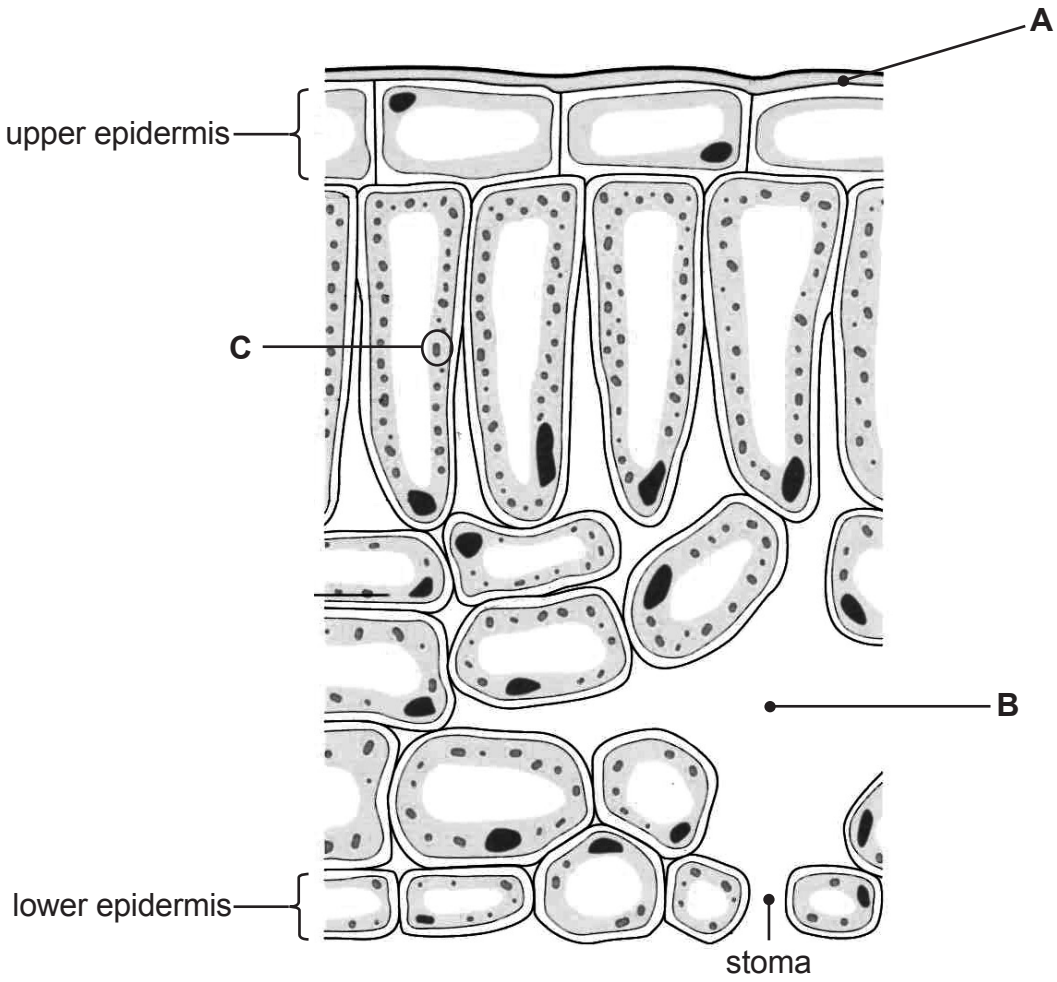
(b) The experiment was repeated using water at a higher temperature.

Suggest how this would affect the time taken for the dye molecules to spread.

_____ [1]

[Turn over

4 The diagram shows a section of a leaf.



Look at the diagram.

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

A _____ [1]

B _____ [1]

C _____ [1]

A leaf is adapted for photosynthesis.

(b) **Draw a line** to link each leaf adaptation to the **best** explanation of how it increases the rate of photosynthesis.

Leaf adaptation	How it increases photosynthesis
Transparent upper epidermis	Large surface area
	Short distance for gas exchange
Stoma in lower epidermis	Reduces water loss from upper epidermis
	Allows maximum light into leaf
Thin leaf	Allows gas exchange into and out of leaf

[3]

5 Organisms release energy through respiration.

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

glucose + ☐ → carbon dioxide + ☐ + energy

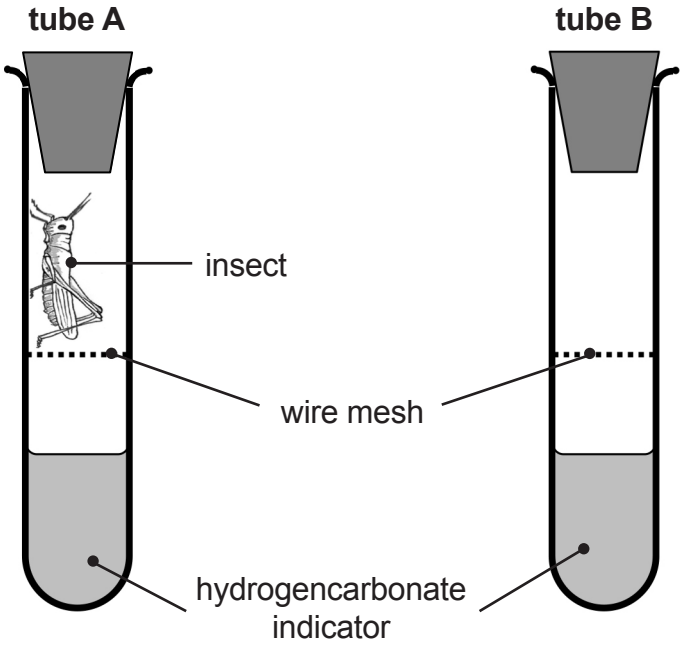
[2]

(ii) Give **two** ways organisms use the energy released in respiration.

1. _____

2. _____ [2]

(b) The diagram shows an experiment set up to investigate respiration.



Look at the diagram.

(i) What is the purpose of tube **B**?

_____ [1]

Hydrogencarbonate indicator changes colour when in contact with air containing different concentrations of carbon dioxide.

Purple	Red	Yellow
Air with **lower than normal** carbon dioxide concentration	Air with **normal** carbon dioxide concentration	Air with **higher than normal** carbon dioxide concentration

(ii) The hydrogencarbonate indicator in tube **A** turned **yellow** after 12 hours.

Use this information and the diagram to explain why.

_____

_____

_____

_____

_____

_____ [3]

[Turn over

6 The table gives some information about food tests.

(a) Complete the six boxes in the table.

Reagent		**End colour for positive test result**
Biuret	blue	
Benedict's		
DCPIP		colourless
Ethanol	clear	

[6]

(b) A student used three of the reagents to carry out tests on three foods **A**, **B** and **C**.

The table shows the results.

✓ = positive result ✗ = negative result

Food tested	Reagent		
	DCPIP	Benedict's	Biuret
A	✓	✓	✗
B	✗	✓	✓
C	✓	✗	✓

Look at the table.

(i) Which **two** of the foods tested contained reducing sugar?

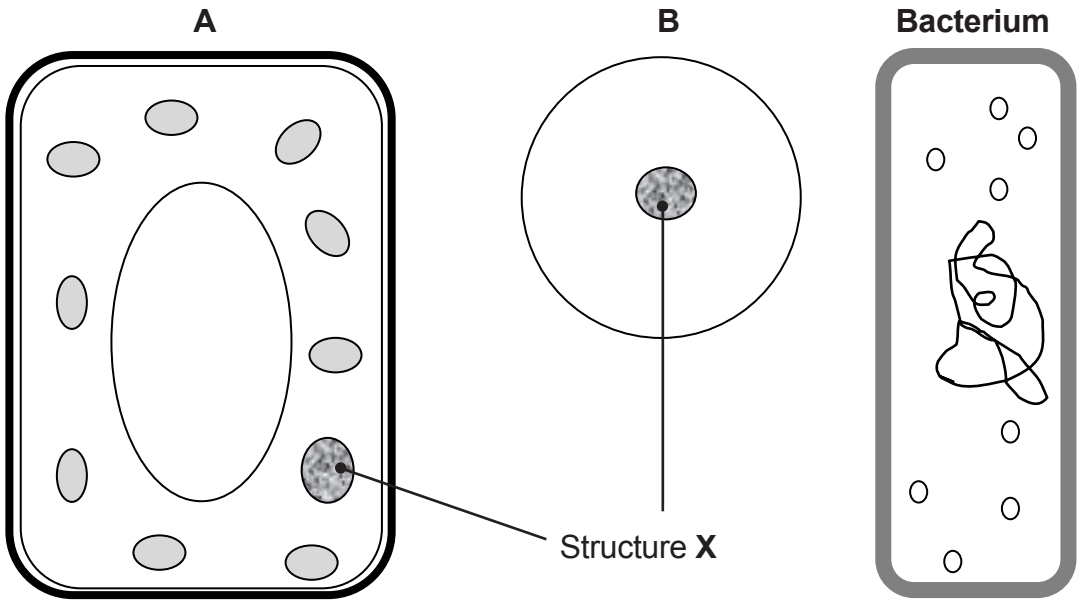
_____ and _____ [1]

(ii) Which food tested contained **both** vitamin C and protein?

_____ [1]

[Turn over

7 The diagrams show three types of cell.



Magnification ×500

Magnification ×50 000

Look at the diagrams.

(a) (i) Name cell types **A** and **B**.

A _____ [1]

B _____ [1]

(ii) Name structure **X**.

X _____ [1]

(b) Name **three** structures found in cell **A** and not in cell **B**.

1. _____ [1]

2. _____ [1]

3. _____ [1]

The length of the bacterium and cell **A** in the diagrams is the same but the magnification of each cell is different.

(c) The actual length of the bacterium is 2 micrometres.

The actual length of cell **A** can be calculated using the formula:

$$\text{Actual length of cell } \mathbf{A} = \frac{\text{Magnification of the bacterium} \times \text{actual length of bacterium}}{\text{Magnification of cell } \mathbf{A}}$$

Calculate the actual length of cell **A**.
Show your working.

Actual length of cell **A** _____ micrometres [2]

[Turn over

(d) Use the information about viruses to answer the questions.

Viruses cause diseases.
Viruses are much smaller than bacteria.
Viruses are not made of cells.
Viruses contain genetic material.

(i) Some scientists think that viruses are non-living.

Which statement would agree with the view that viruses are non-living?

_____

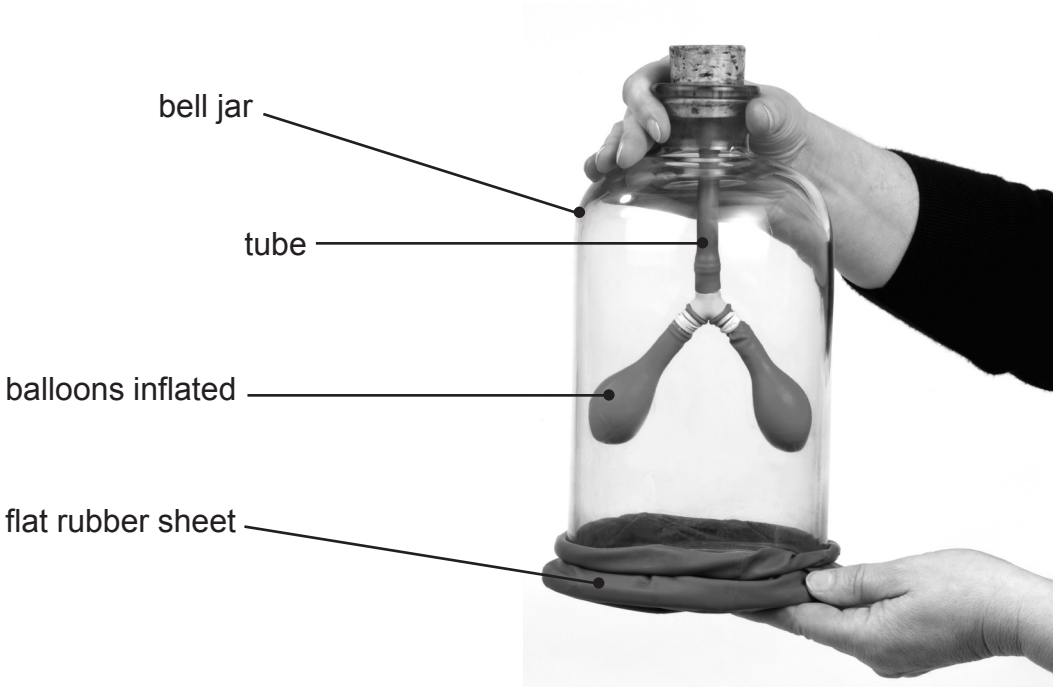
_____ [1]

(ii) Which statement suggests that viruses are living?

_____

_____ [1]

8 **(a)** The photograph shows a lung model of the respiratory system.



(i) When the rubber sheet is flat the balloons are inflated.

Explain how pushing the rubber sheet up causes air to move out of the balloons.

_____

_____

_____ [2]

(ii) In the body, the ribs help move air out of the lungs during exhalation.

Describe how the action of this model differs from the action of the ribs during exhalation.

_____

_____

_____ [2]

[Turn over

(b) A pupil investigated the effect of different types of exercise on her breathing rate.

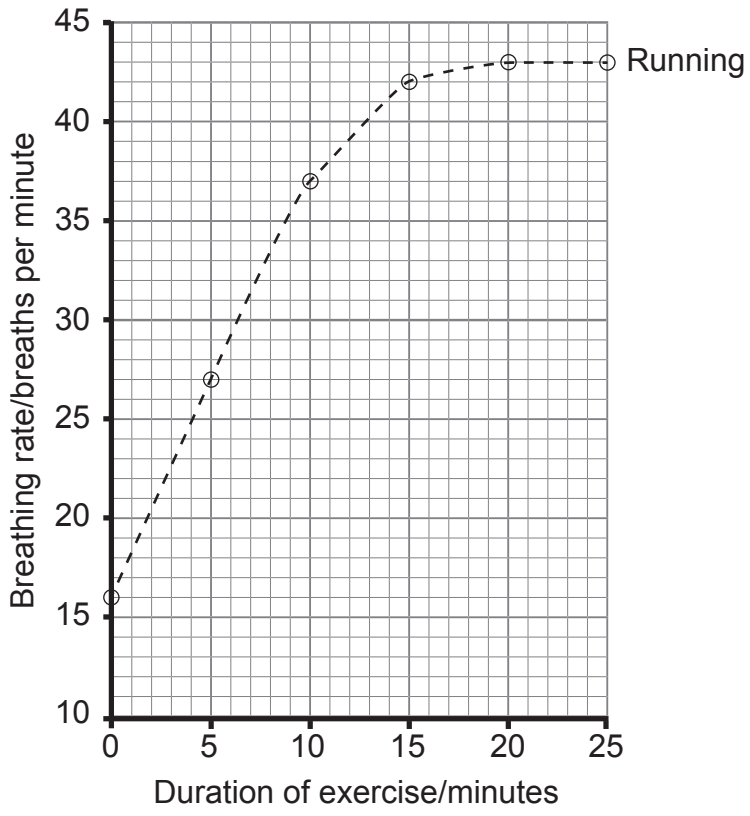
She ran on a treadmill for different lengths of time and recorded her breathing rate after each period of exercise.

She repeated the experiment doing sit-ups.

The table shows her results.

Duration of exercise/minutes	Breathing rate/breaths per minute	
	Running	Sit-ups
0	16	16
5	27	19
10	37	22
15	42	25
20	43	28
25	43	31

(i) **Complete the graph** by plotting the results for sit-ups.



[3]

Look at the graph.

(ii) Describe the trend in the results for running.

_____

_____

_____ [2]

(iii) Running is a more tiring way to exercise than sit-ups.

How long would this pupil need to spend doing sit-ups to have the **same** breathing rate as she would have after 5 minutes running?

_____ minutes [1]

(iv) Running and sit-ups have different effects on the pupil's breathing rate.

Give **two** differences.

_____

_____

_____

_____ [2]

(v) Explain why the breathing rate changes during exercise.

_____

_____

_____ [2]

[Turn over

(c) A boy took part in a training programme to improve his fitness.

The table shows the breathing rate and the volume of each breath before and after the training programme.

(i) Complete the table.

	Breathing rate/breaths per minute	Volume of each breath/litre	Total volume breathed/litres per minute
Before training	15	0.3	4.5
After training	12	0.5	

[1]

(ii) Describe the effect of training on the **total** volume of air breathed per minute.

_____

_____

_____ [1]

9 The table gives information about food molecules.

Complete the table.

Food molecules	Smaller molecules they are made from	Main function in the body
Carbohydrates		
Fats		Energy store
Proteins		Growth and repair

[4]

10 The diagram shows part of a food web found in a woodland.

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hawk

© Bildagentur-Online / Science Photo Library

fox

© Luis Montanya / Marta Montanya / Science Photo Library

weasel

© Colin Varndell / Science Photo Library

red squirrel

© Natural History Museum / Science Photo Library

field mouse

© Luis Montanya / Marta Montanya / Science Photo Library

rabbit

© Simon Fraser / Science Photo Library

plants

(a) Describe the role of plants in this food web.

_____

_____

_____

_____

_____

_____ [3]

In this woodland, disease killed many red squirrels.

(b) Explain how this would affect the number of field mice.

_____

_____

_____

_____

_____ [2]

11 The photograph shows how a plant responds to light from one direction.

Look at the photograph.

(a) Name the plant's response to light.

_____ [1]

(b) The hormone auxin causes the plant to bend.

Explain how.

_____

_____

_____

_____ [2]

(c) Suggest why this response may benefit the plant.

_____

_____

_____

_____

_____ [2]

12 A class of students set up an investigation into the effect of amylase and lipase enzymes on starch solution.

They set up two test tubes each containing 5 cm^3 of starch solution.

They added 2 cm^3 of amylase solution to tube **A**.

They added 2 cm^3 of lipase solution to tube **B**.

The students then placed tubes **A** and **B** in a water bath at 35 °C for 30 minutes.

After 30 minutes the students added 5 drops of iodine to each tube.

The colour of the solution in each tube was recorded.

The table shows their results.

Tube	Enzyme present	Colour of starch solution after 30 minutes
A	amylase	yellow/brown
B	lipase	blue/black

Explain the results for amylase and lipase.

Use your knowledge of enzyme structure and action to support your answer.

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

[6]

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For Examiner's use only	
Question Number	Marks
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Total Marks	

Examiner Number