Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2018

Biology

Unit 1
Higher Tier

[GBY12]

GBY12

FRIDAY 8 JUNE, MORNING

TIME

1 hour 30 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 100.
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 Questions **4** and **10(b)**.

1 **(a)** A plant seedling received bright light from one side.

The diagram shows the plant seedling at the start and after 24 hours.

Look at the diagram.

(i) Name this response to light.

_____ [1]

(ii) Name the plant hormone which brings about this response.

_____ [1]

(iii) Explain how this response is brought about.

_____

_____

_____

_____

_____

_____ [2]

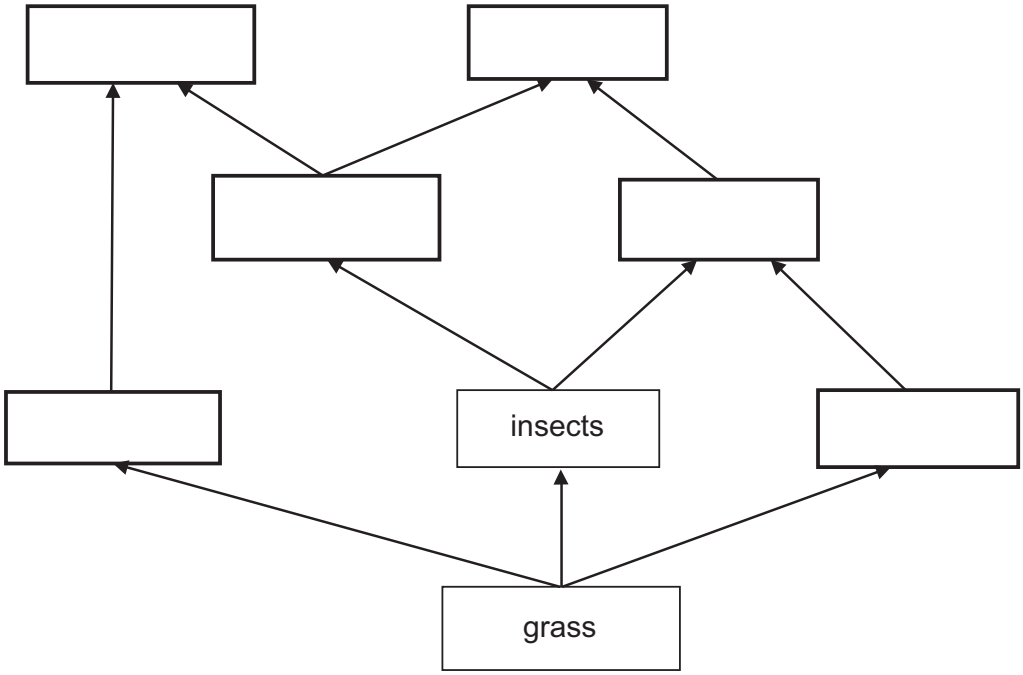
(b) Give **one** commercial use of plant hormones.

_____ [1]

2 The following sentences give information about feeding relationships.

> Grass is a producer.
>
> Rabbits, slugs and insects are primary consumers.
>
> Frogs and thrushes eat insects.
>
> Thrushes also eat slugs.
>
> Hawks are predators of thrushes and frogs.
>
> Foxes eat rabbits and frogs.

(a) Use the information in the sentences to **complete the food web**.



Source: Principal Examiner

[3]

(b) What is the role of a producer in a food web?

_____

_____

_____

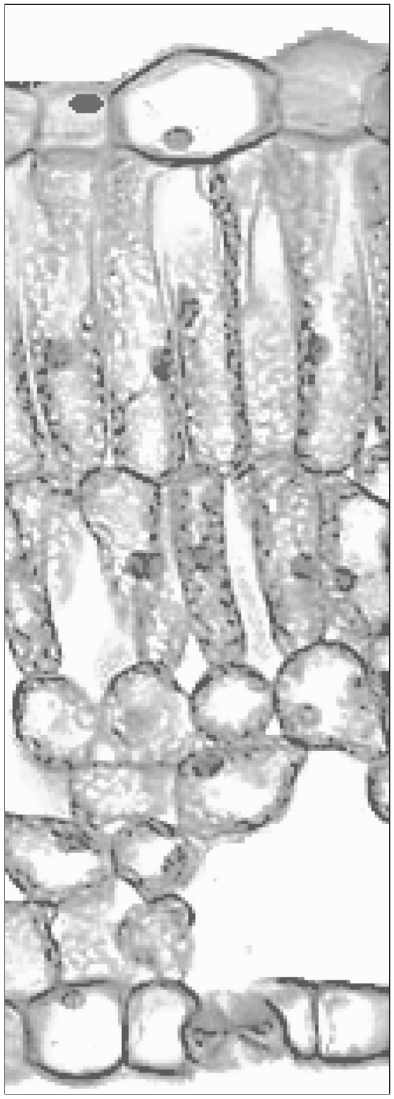
_____ [2]

[Turn over

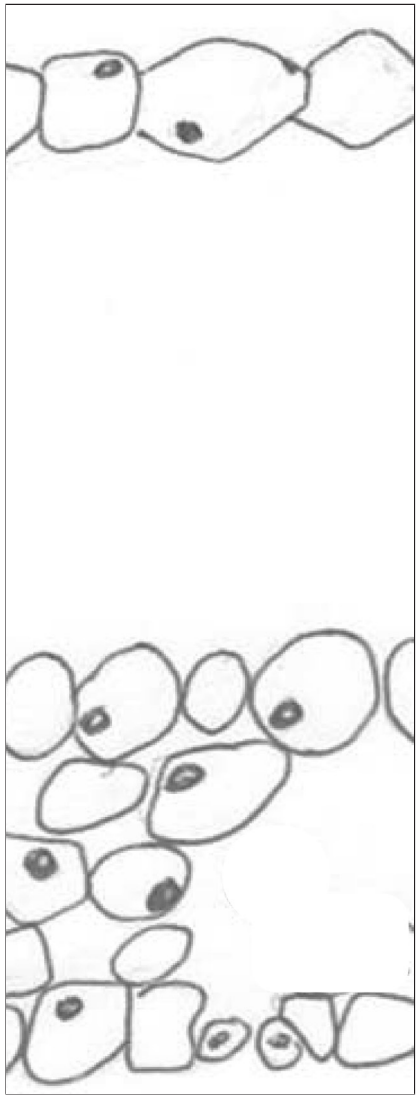
3 The photograph shows a section of a leaf viewed under a microscope.

A pupil made a drawing of this leaf section.

Photograph of leaf section



Drawing of leaf section



(a) Complete the drawing of this leaf section. [3]

(b) On the **drawing, label with a line** a:

- palisade mesophyll cell.
- guard cell. [2]

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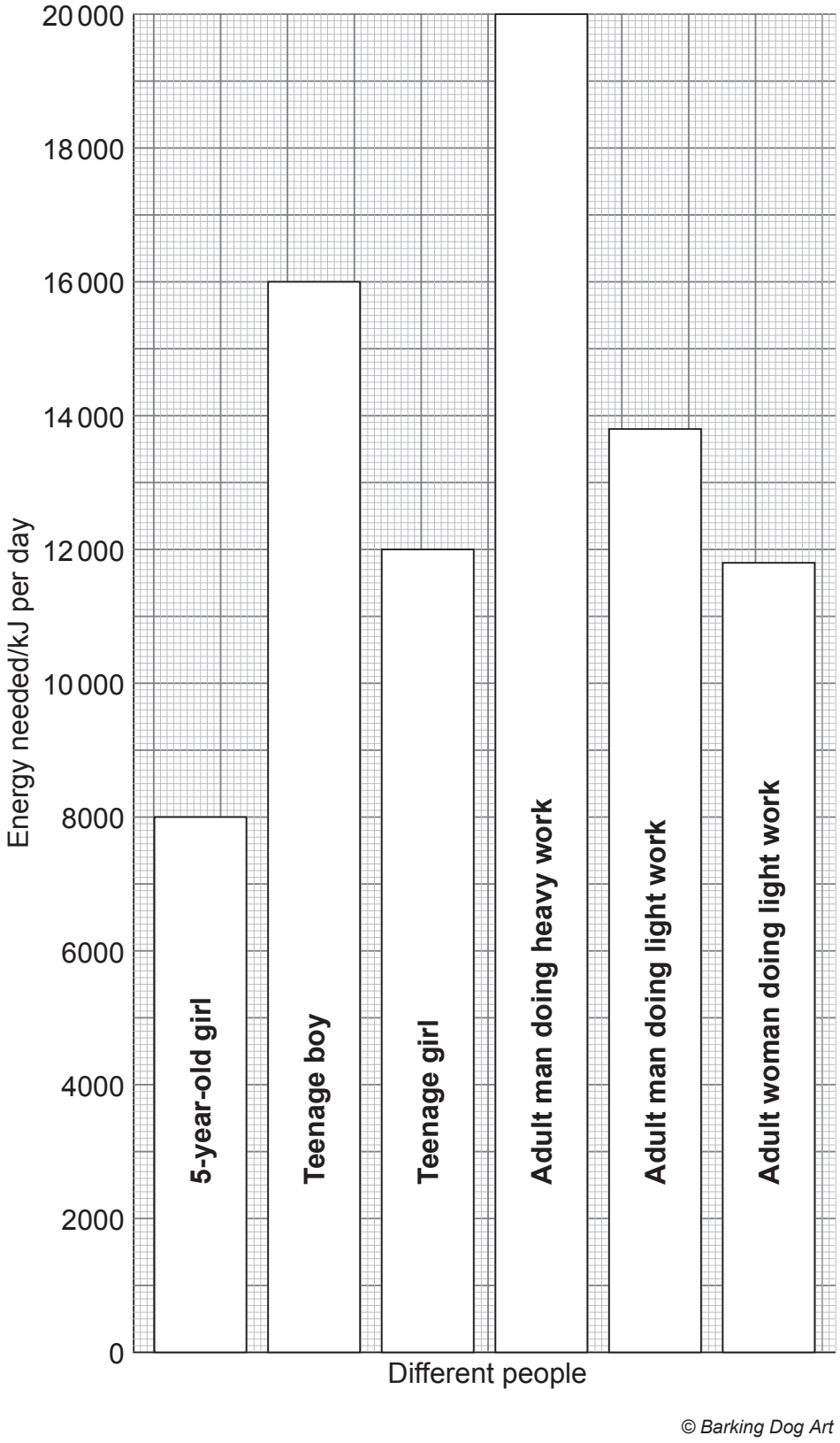
(Questions continue overleaf)

4 The bar graph shows the energy needed per day by different people.



11253.05 **R**

Look at the bar graph.

Name **three** factors which affect the energy needs of different people.

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

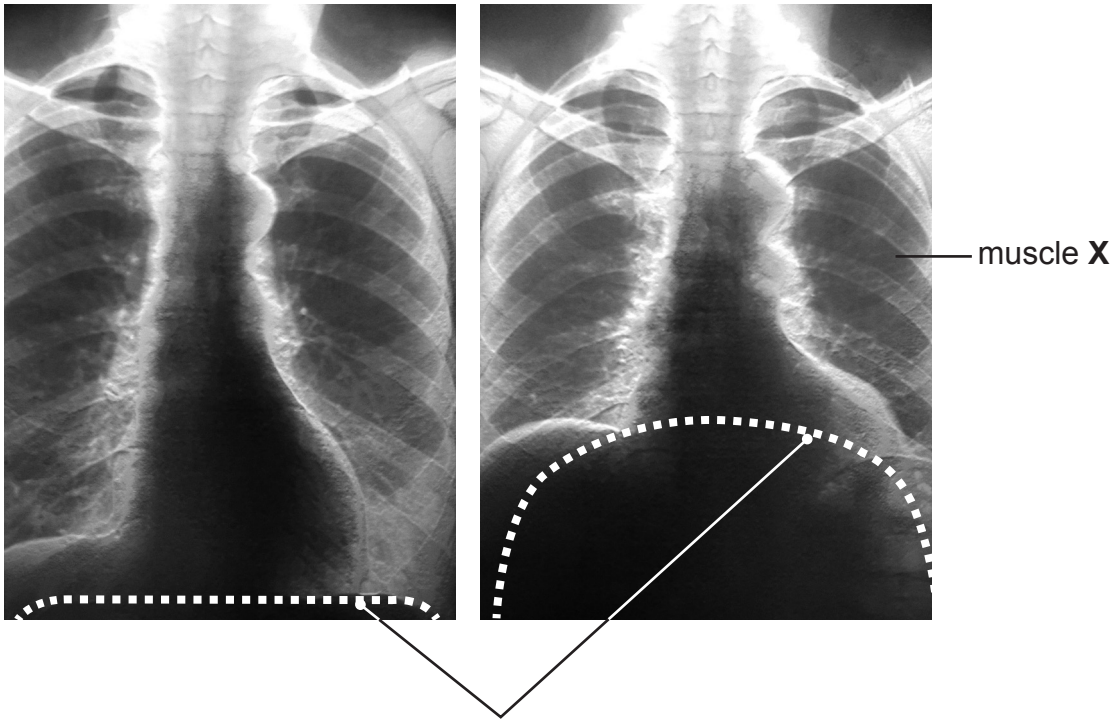
In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

[6]

[Turn over

5 **(a)** Photographs **A** and **B** show how the respiratory system changes during the process of breathing.

Photograph **A** Photograph **B**



(i) Name muscle **X**.

_____ [1]

Photograph **B** was taken during **breathing out**.

(ii) Give **two** pieces of evidence from photograph **B** to support this statement.

1. _____

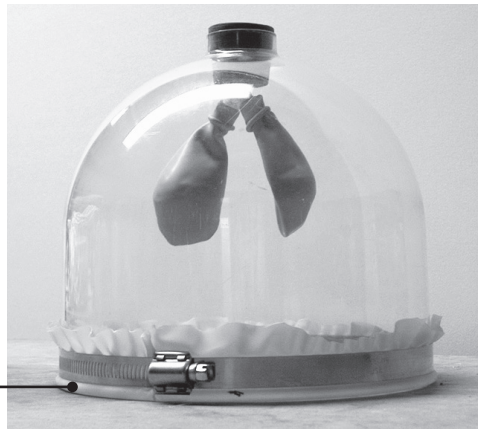
_____

2. _____

_____ [2]

Photograph **C** shows a lung model.

Photograph **C**



© Louis Grace, Physics Lecture Demonstration Coordinator. Department of Physics, University of California, Santa Barbara

(b) Describe and explain how the lung model can be used to demonstrate **breathing in**.

_____

_____

_____

_____

_____

_____

_____

_____

_____ [4]

(c) Describe **one** way the process of breathing in, as demonstrated by this model, differs from the action of the respiratory system.

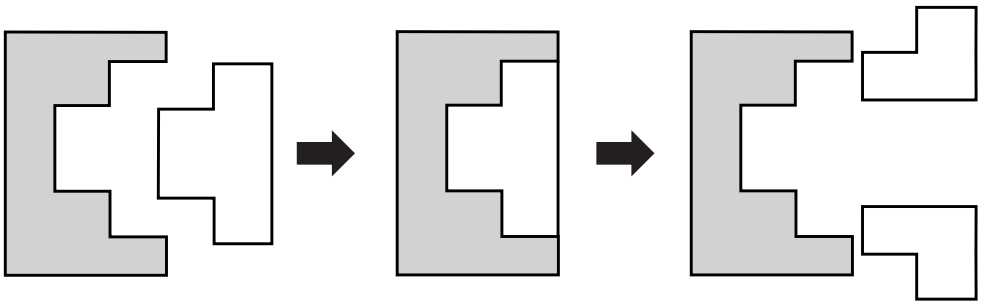
_____

_____

_____ [1]

[Turn over

6 The diagram shows the action of an enzyme.



(a) Use the diagram to help describe the theory of enzyme action.

_____

_____

_____

_____

_____

_____

_____ [4]

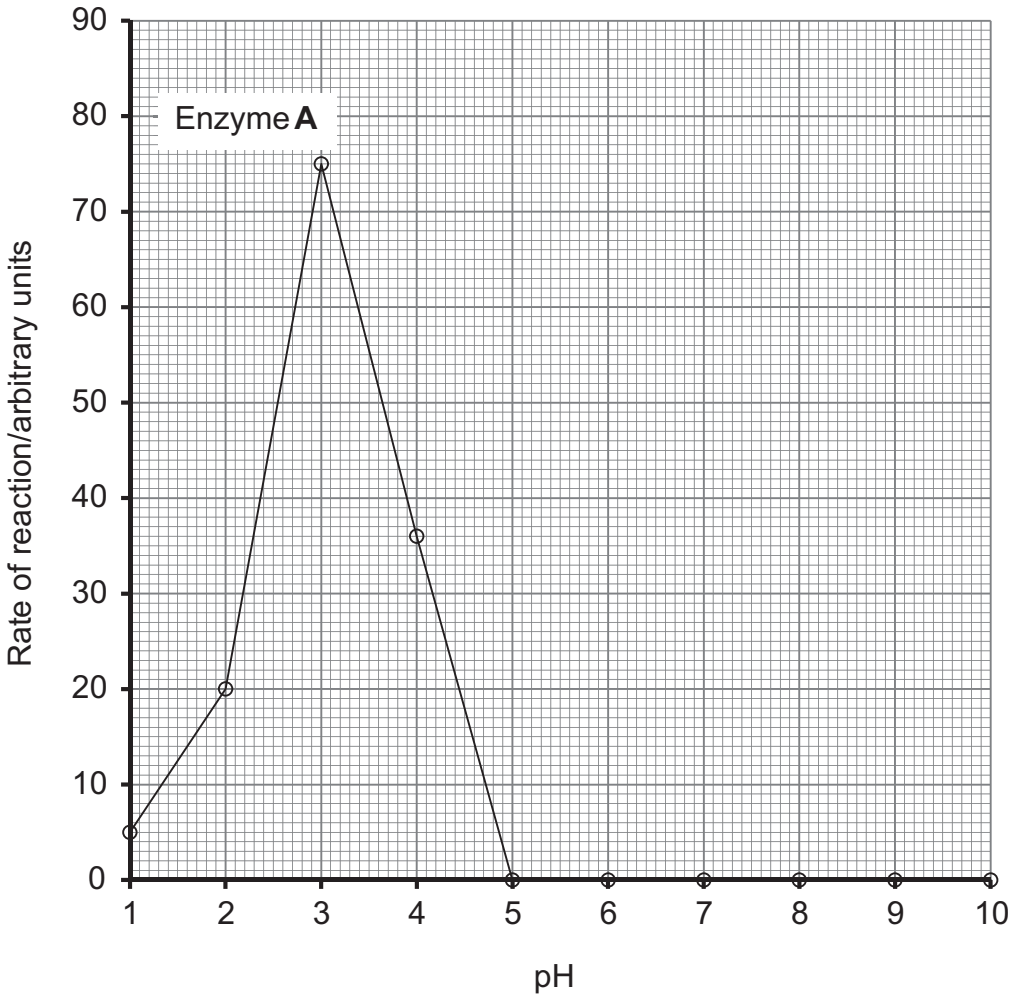
(b) A pupil carried out an experiment to investigate the effect of pH on the rate of reaction of two different enzymes, **A** and **B**.

The table shows the results.

pH	Rate of reaction/arbitrary units	
	Enzyme A	Enzyme B
1	5	0
2	20	0
3	75	0
4	36	0
5	0	5
6	0	10
7	0	63
8	0	88
9	0	56
10	0	30

The graph shows the results for enzyme **A**.

(i) Complete the graph by plotting a line graph for the rate of reaction of enzyme **B**. [3]



(ii) Describe and explain how these enzymes are affected by pH.

Give data from the graph to support your answer.

_____

_____

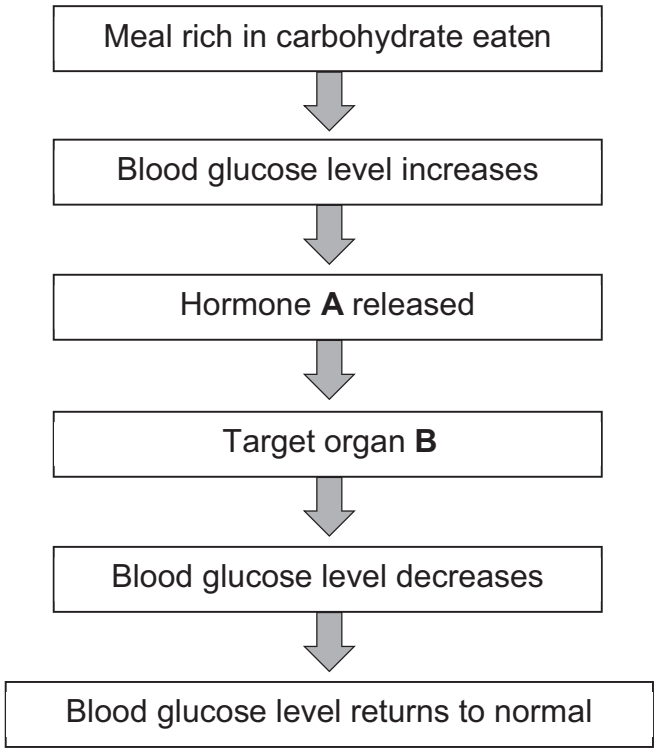
_____

_____

_____ [3]

[Turn over

7 **(a)** The diagram shows changes in a person's blood glucose level after eating a meal rich in carbohydrate.



(i) Explain why the blood glucose level increases after eating a meal rich in carbohydrates.

_____

_____

_____

_____ [2]

(ii) Name hormone **A** and target organ **B**.

Hormone **A** _____ [1]

Target organ **B** _____ [1]

(iii) Explain how hormone **A** decreases the blood glucose level.

_____

_____

_____

_____ [2]

(b) The table shows the number of adults with diabetes in Northern Ireland.

Year	Number of adults with diabetes
2004–5	51 541
2005–6	54 950
2006–7	56 924
2007–8	60 822
2008–9	65 066
2009–10	68 980
2010–11	72 693

(i) Calculate the percentage change in the number of adults with diabetes from 2004–5 to 2010–11.

Show your working.

Answer _____ % [3]

[Turn over

(ii) Suggest **two** reasons for this change in the number of adults with diabetes.

1. _____

_____

2. _____

_____ [2]

(iii) Give **one** long-term effect of diabetes.

_____

_____ [1]

(iv) Describe **one** cost to society of diabetes.

_____

_____

_____ [1]

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(Questions continue overleaf)

8 A pupil carried out an experiment to measure the concentration of vitamin C in orange juice.

1 cm^3 of the DCPIP was placed in a test tube and the volume of orange juice required to decolourise it was recorded.

The experiment was repeated three times.

The results are shown in the table.

Experiment	Volume of orange juice needed to decolourise 1 cm^3 DCPIP/cm^3
1	0.76
2	0.48
3	0.74

In a separate experiment carried out with a **standard** vitamin C solution, 0.1 mg of vitamin C was needed to decolourise 1 cm^3 DCPIP.

(a) Calculate the average concentration of vitamin C in **1 cm^3** orange juice.

Show your working.

_____ mg cm^{-3} [3]

(b) The pupil concluded that the results in the table were unreliable.

Use evidence from the table to suggest why.

_____

_____

_____

_____ [2]

(c) Suggest why the pupil found it difficult to decide when the DCPIP was decolourised.

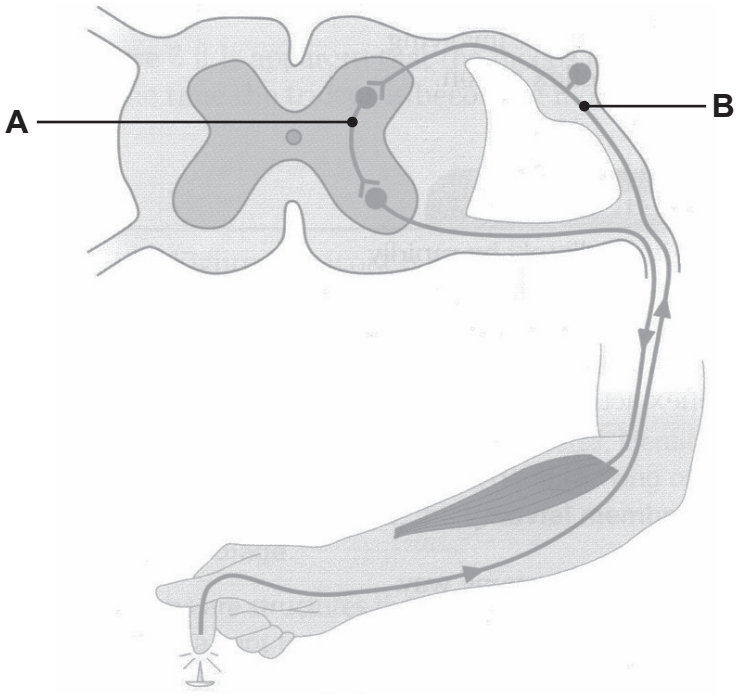
_____

_____

_____ [1]

[Turn over

9 **(a)** The diagram shows a reflex arc.



(i) Name the neurones **A** and **B**.

A _____ [1]

B _____ [1]

Neurone **B** is long.

(ii) Describe and explain **one other** way neurones are adapted to transmit electrical nerve impulses.

_____

_____

_____

_____ [2]

(iii) Give **two** differences between an involuntary reflex action and a voluntary action.

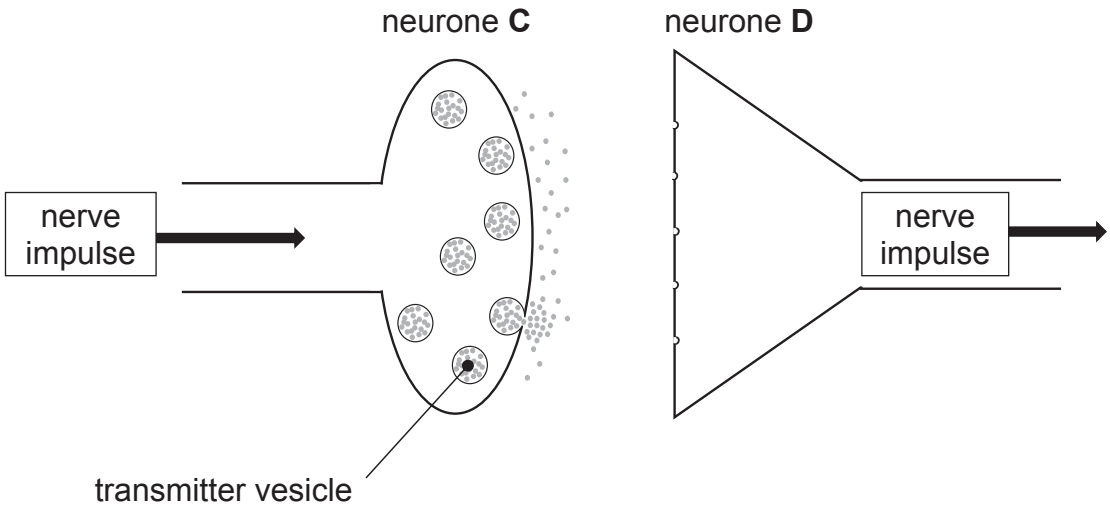
1. _____

_____ [1]

2. _____

_____ [1]

The diagram shows a synapse between two neurones.



(b) Use the diagram to describe how the nerve impulse in neurone **C** causes a nerve impulse in neurone **D**.

_____

_____

_____

_____

_____

_____

_____ [4]

[Turn over

10 (a) Farmers apply fertilisers to increase the growth of grass.

Slurry is a mixture of faeces and urine from the farm animals which is used as fertiliser.

Farmers grow clover plants because they carry out nitrogen fixation.

The table gives some information about farming in **three** fields in County Tyrone.

Field	Crop	Fertiliser	Percentage of air in soil/%
A	grass	slurry	32
B	grass and clover mix	slurry	39
C	grass	artificial fertiliser	16

Use the information in the table to help answer the following questions.

(i) Suggest which field **A**, **B** or **C** is most likely to become waterlogged after heavy rain.

Explain your answer.

Field _____ [1]

Explanation _____

_____ [1]

(ii) Suggest **two** ways the farmer could reduce the chance of waterlogging in this field.

1. _____

2. _____ [2]

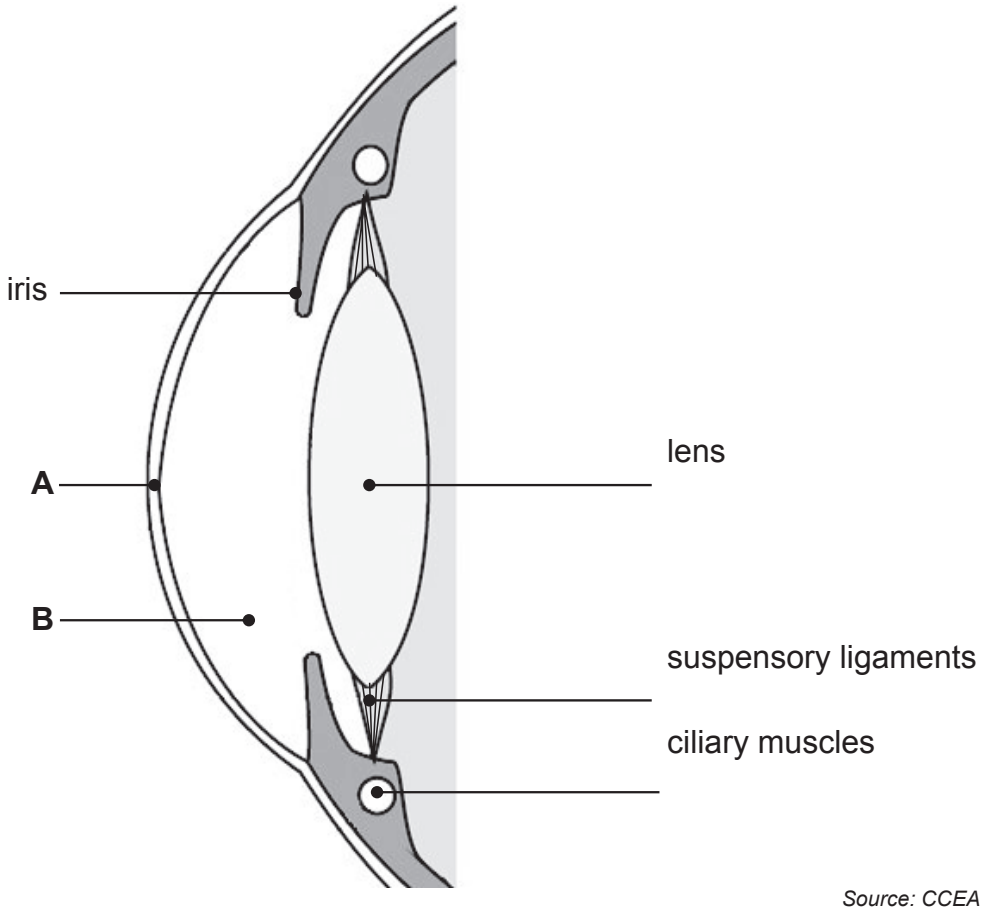
(b) Describe and explain **two** reasons why the grass in field **B** would grow more than the grass in field **A**.

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

[6]

[Turn over

11 The diagram shows a section through the front of an eye.



Source: CCEA

(a) (i) Name part **A**.

_____ [1]

(ii) Name the substance filling part **B**.

_____ [1]

(b) Explain how the ciliary muscles and suspensory ligaments change the shape of the lens when focusing on a distant object.

[3]

(c) Describe how the muscles of the **iris** have adapted this eye for dim light.

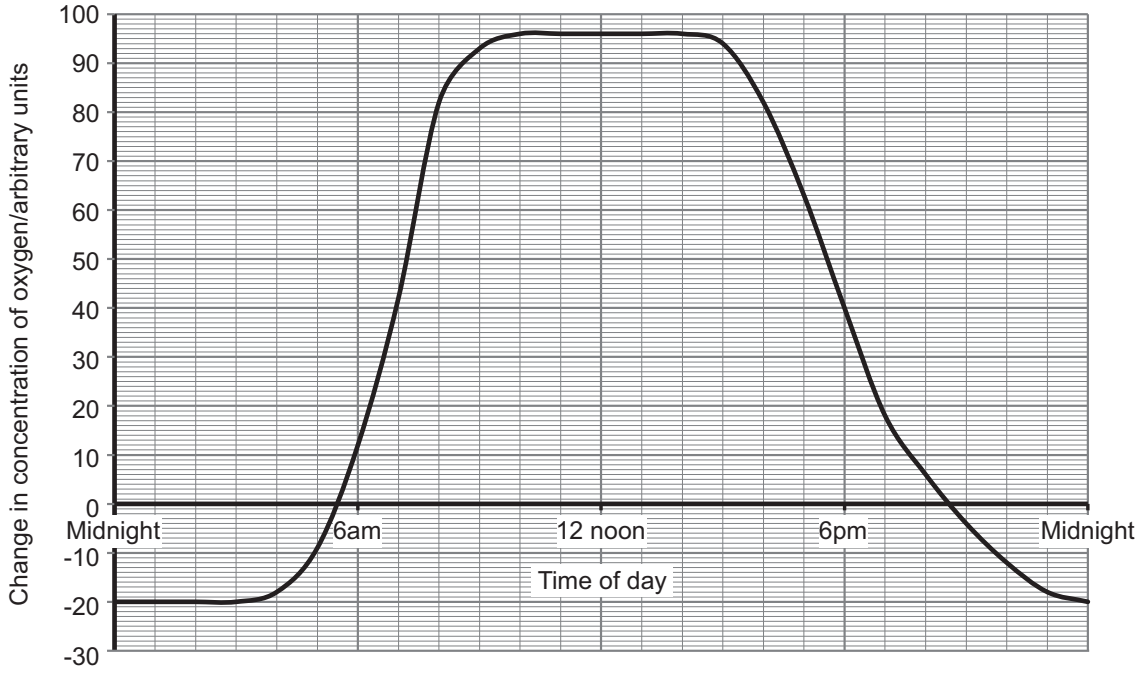
Use evidence from the diagram to support your answer.

[4]

12 **(a)** Complete the balanced chemical equation for photosynthesis.

[ ] + [ ] ⟶ $C_6H_{12}O_6$ + [ ] [3]

(b) The graph shows changes in the concentration of oxygen in the air around a leaf over a 24-hour period.



(i) Describe and explain the change in the concentration of oxygen between midnight and 3 am.

[5]

(ii) Explain why there is no change in the concentration of oxygen at 5:30 am.

[3]

(iii) Explain the shape of the graph between 10 am and 2 pm.

[2]

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For Examiner's use only	
Question Number	**Marks**
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Total Marks	

Examiner Number