

New
Specification



Rewarding Learning

General Certificate of Secondary Education
2017–2018

Centre Number

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Candidate Number

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Double Award Science: Biology

Unit B1

Higher Tier



[GDW12]

GDW12

TUESDAY 15 MAY 2018, AFTERNOON

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 ten** 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.

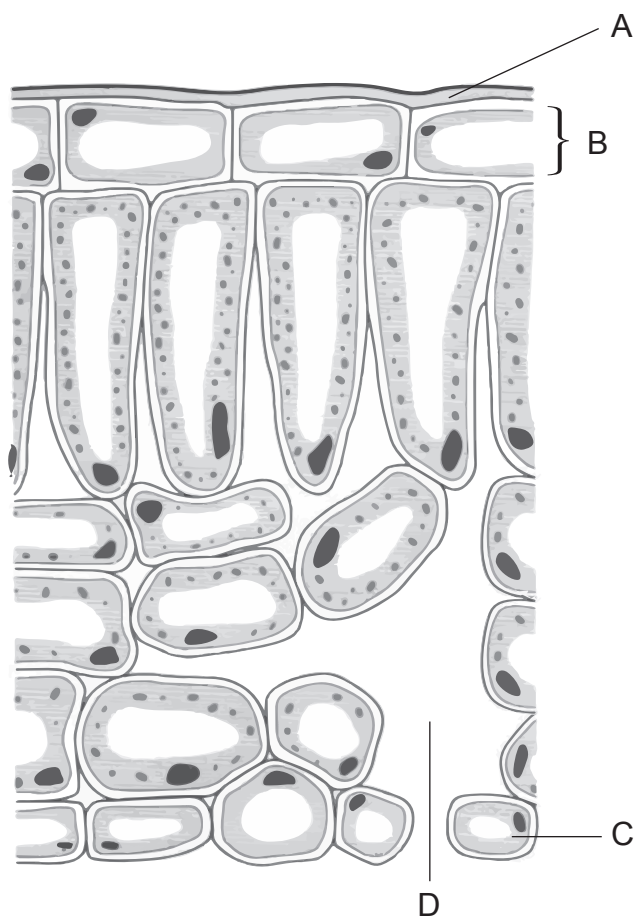
Quality of written communication will be assessed in Question **4(a)**.

11656



24GDW1201

- 1 (a) The diagram shows the cross section of a leaf.



© Barking Dog Art

- (i) Name layer B.

[1]

- (ii) Name cell C.

[1]



(b) A is the cuticle.

(i) Give **one** way the cuticle is adapted for light absorption.

_____ [1]

(ii) Give **one** way the cuticle is adapted to reduce water loss.

_____ [1]

(c) Name D and give its function.

Name _____

Function _____
_____ [2]

[Turn over]



- 2 A man completed a questionnaire to estimate his risk of developing diabetes in the next 10 years.
Some information about the man is given below.

The man is 64 years old.
He is being treated for high blood pressure.
His brother has diabetes.

The table below shows three questions from the questionnaire and the point scoring system used.

- (a) Use the information above about the man to complete his questionnaire.
Write the points he scored in the empty boxes in the table below.
The points scored for the first question are given.

Question	Point scoring system	Points scored
Do you have a diabetic parent, brother or sister?	Yes = 2 No = 0 Don't know = 1	2
Are you being treated for high blood pressure?	Yes = 2 No = 0 Don't know = 1	
What age are you?	40–49 = 0 50–59 = 1 over 60 = 2	

[2]



(b) Which type of diabetes is this man most likely to develop in the next 10 years?

[1]

(c) The results from the questionnaire showed this man has a high risk of developing diabetes in the next 10 years.

Suggest **two** lifestyle changes he should make to reduce his risk of developing diabetes in the next 10 years.

1. _____

2. _____

[2]

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

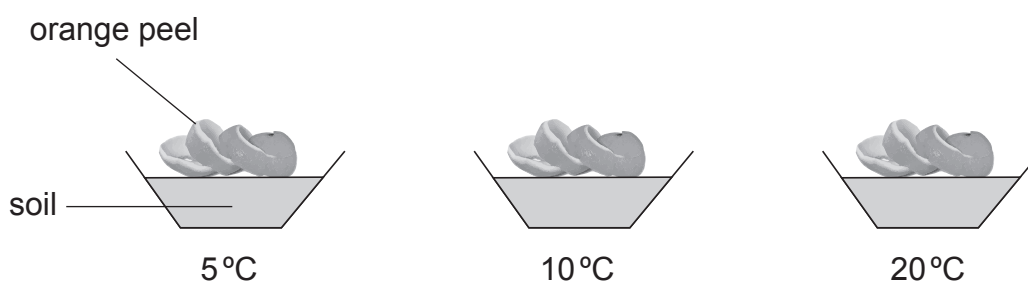
[1]

[Turn over



- 3 Pupils carried out an investigation into the effect of temperature on the rate of decomposition of orange peel. They placed the same mass of orange peel in three dishes containing soil. Each dish was kept at a different temperature for four weeks. The pupils recorded the percentage of orange peel **remaining** at the end of each week for four weeks.

The diagram shows their set-up at the start of the experiment.



The table below gives the pupils' results.

Temperature orange peel is kept at/°C	Percentage of orange peel remaining at the end of:			
	Week 1	Week 2	Week 3	Week 4
5	100	90	75	60
10	95	80	60	40
20	90	70	45	20

- (a) What percentage of orange peel had **decomposed** by the end of **week 4** at 5 °C?

_____ % [1]



- (b) What effect did temperature have on the rate of **decomposition** of the orange peel over the four weeks?
Give data from week four to support your answer.

[2]

- (c) (i) Other than temperature, name **one** factor that can affect the rate of decomposition.

[1]

- (ii) Name the **two** types of microorganism that can carry out decomposition.

1. _____

2. _____

[2]

- (iii) Describe how these microorganisms carry out the decomposition of the orange peel.

[3]

[Turn over



(b) Describe and explain how inhibitors affect the action of enzymes.

[2]

5 The nervous system coordinates responses in the body.

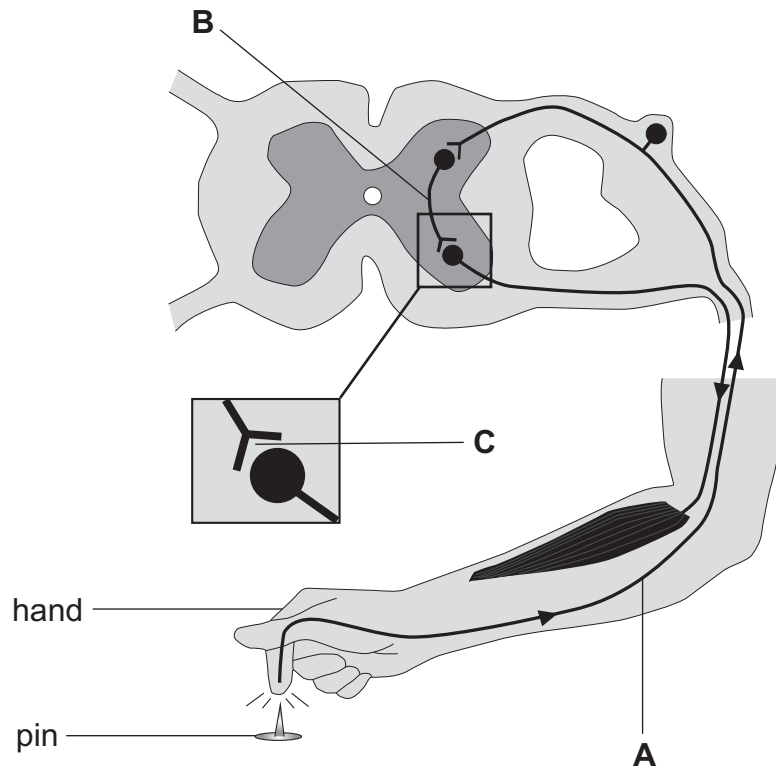
(a) Give **two** differences between voluntary and reflex actions in the nervous system.

1. _____

 2. _____

- [2]

(b) The diagram shows a reflex arc.



(i) Name the **two** types of neurones A and B.

- A _____
- B _____

[2]



(ii) Name the gap between the two neurones at C.

[1]

(iii) Name the **two** types of effector in the body.

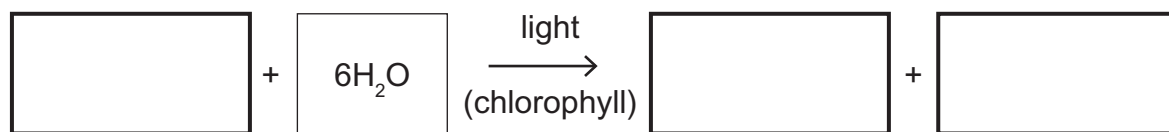
1. _____

2. _____

[2]

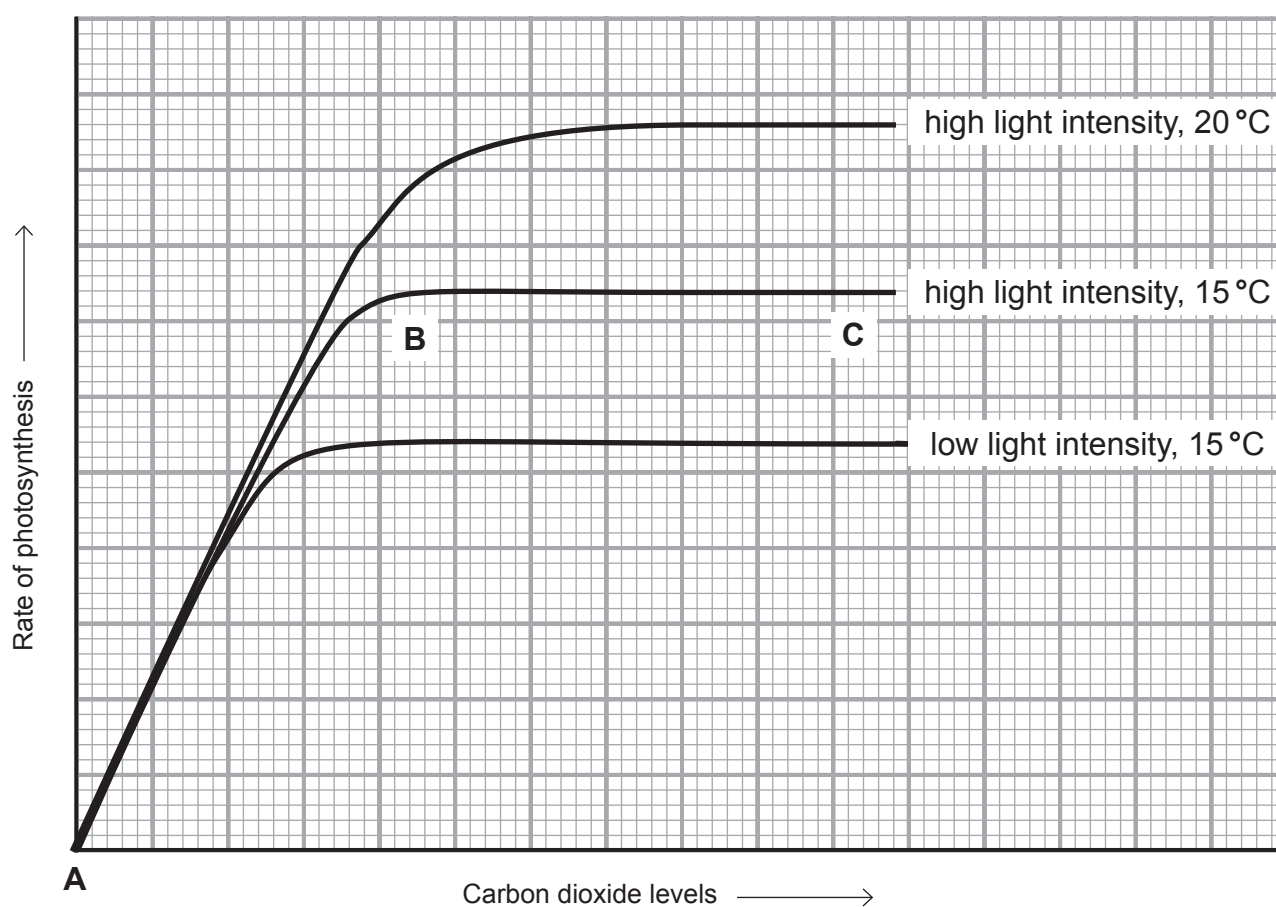


- 6 (a) Complete the balanced chemical equation for photosynthesis by writing in the empty boxes.



[3]

- (b) The graph below shows how different factors affect the rate of photosynthesis in a plant.



Adapted from © Biology Discussion



Use the information in the graph opposite to answer the following questions.

- (i) Give the factor that is limiting the rate of photosynthesis between A and B.
Explain your answer.

Factor _____

Explanation _____

_____ [2]

- (ii) Give the factor that is limiting the rate of photosynthesis between B
and C.

[1]

[Turn over

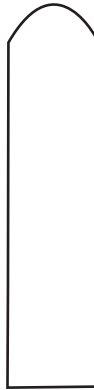


7 Auxin is produced in plant shoots.

(a) What type of substance is auxin?

[1]

(b) The diagram shows a plant shoot.

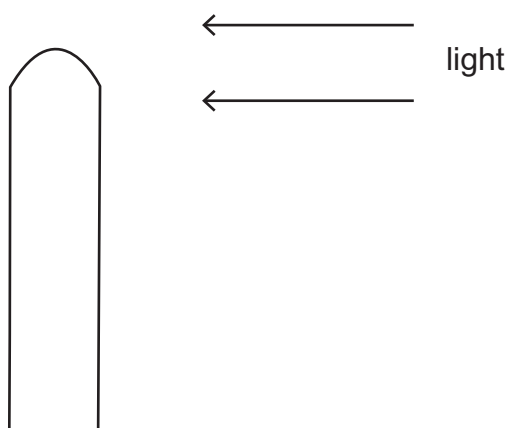


(i) Mark on the diagram, with an **X**, to show where auxin is produced.

[1]



The diagram below shows light shining on a plant shoot from one side.



(ii) Shade the diagram above to show where most auxin will be present in this shoot after several hours. [1]

(iii) Complete the diagram below of the shoot shown in part (ii) as it would appear after two days.



[1]

(iv) Explain the appearance of this shoot after two days.

[2]

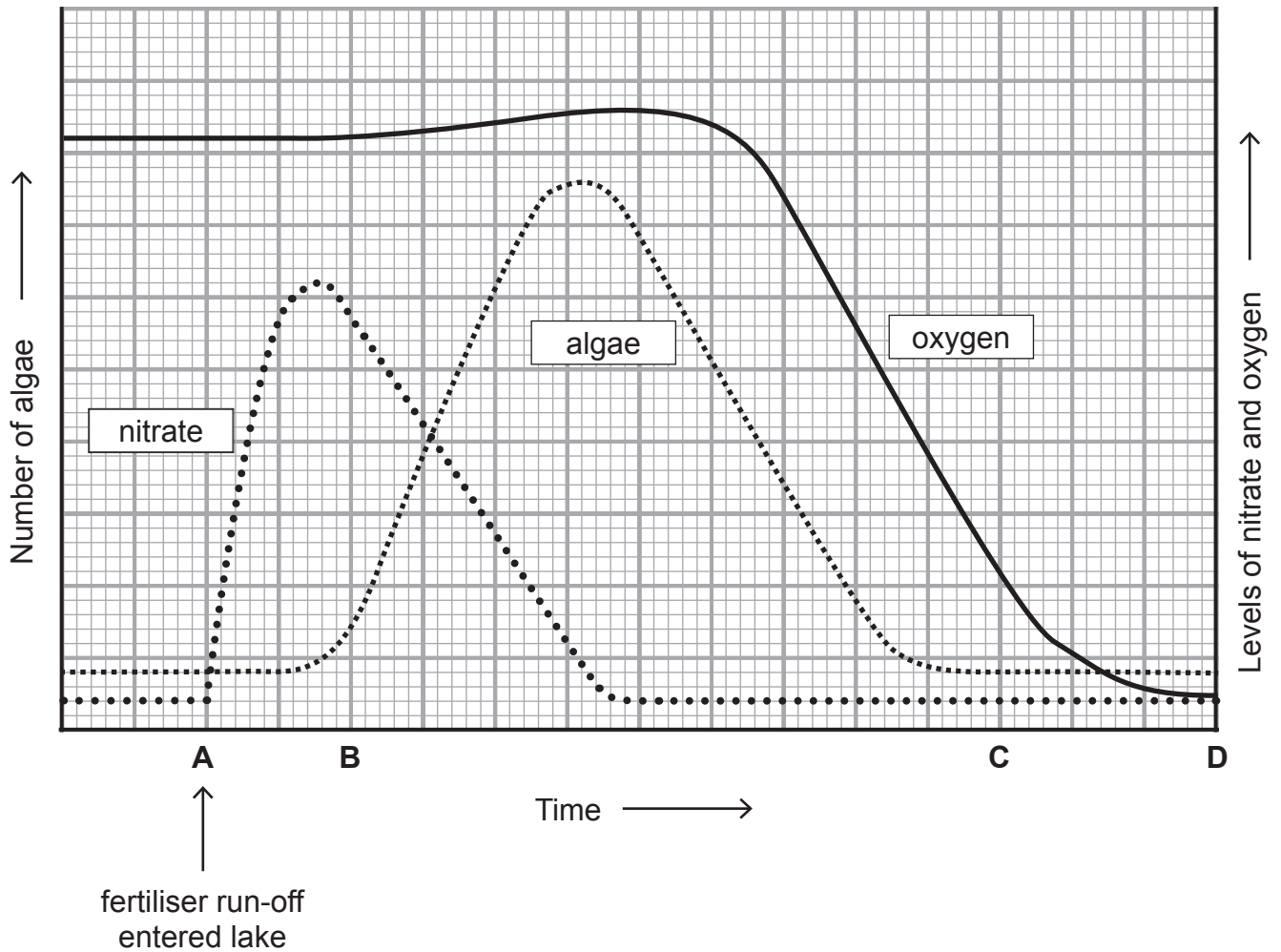
[Turn over]



8 The graph shows:

- the number of algae
- the levels of nitrate and oxygen

in a lake at various times before and after fertiliser run-off entered the lake from neighbouring fields.



Source: Chief Examiner



- (a) Describe and explain the changes in the number of **algae** in the lake between times **A** and **C**.

Description _____

_____ [1]

Explanation _____

_____ [2]

- (b) The **oxygen** levels in the lake increased then decreased between times **B** and **D**.

- (i) Explain why the oxygen levels **increased**.

_____ [1]

- (ii) Explain why the oxygen levels **decreased**.

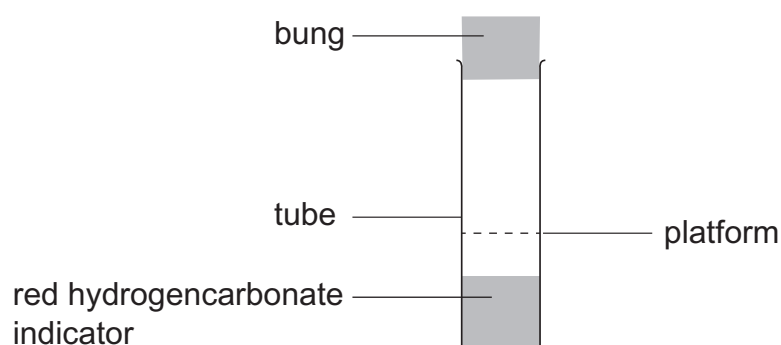
_____ [3]

[Turn over]



- 9 A student investigated respiration in three types of small animals, A, B and C. The student placed the same mass of each type of animal on a platform in a tube containing hydrogencarbonate indicator. She recorded the time taken for the indicator in each tube to turn yellow.

The diagram shows the experimental set-up.



Source: Principal Examiner

- (a) Explain why the hydrogencarbonate indicator turns yellow.

[1]



The table shows the student's results.

Type of animal	Time taken for hydrogencarbonate indicator to turn yellow/min
A	6
B	2
C	4

- (b) Use the information in the table above to give the type of animal that respired the fastest.
Give a reason for your choice.

Type of animal

Reason

[2]

[Turn over



- (c) The student used the same experimental set-up to investigate respiration and photosynthesis in the same mass of cabbage and spinach leaves. She placed a lamp the same distance from each tube and recorded the colour of the hydrogencarbonate indicator after one hour.

The table shows the student's results.

Type of leaf	Colour of hydrogencarbonate indicator after one hour
cabbage	red
spinach	purple

- (i) Explain the student's result for the cabbage leaves.

[2]

- (ii) Explain the student's result for the spinach leaves.

[2]



Spinach leaves contain more chlorophyll than cabbage leaves.

(iii) Explain how the colours of the hydrogencarbonate indicator shown in the table opposite support this statement.

[1]

[Turn over



10 The nitrogen cycle involves several types of nitrogen bacteria.

(a) What is the role of nitrogen-fixing bacteria?

[1]

Soil contains millions of nitrogen bacteria.

The table below shows the numbers of different types of nitrogen bacteria in samples from three different soils, A, B and C.

The samples of soil were of equal mass.

Type of nitrogen bacteria	Number of bacteria/millions		
	Soil A	Soil B	Soil C
nitrogen-fixing	350	500	90
nitrifying	450	400	110
denitrifying	200	100	800

Source: Principal Examiner

(b) Use the information in the table to give the soil A, B or C which has the lowest **nitrate** content.

Explain your answer.

Soil _____ [1]

Explanation _____

[2]



- (c) In soils that lack oxygen, plants cannot absorb enough nitrates from the soil to grow well.
Explain why.

[3]

THIS IS THE END OF THE QUESTION PAPER



DO NOT WRITE ON THIS PAGE

For Examiner's
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Total Marks	
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Examiner Number

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