



General Certificate of Secondary Education
2017

Centre Number

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Candidate Number

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Biology

Unit 1

Higher Tier



[GBY12]

GBY12

FRIDAY 9 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 **11(a)**.



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32GBY1202

1 The table gives information about food molecules.

Complete the table.

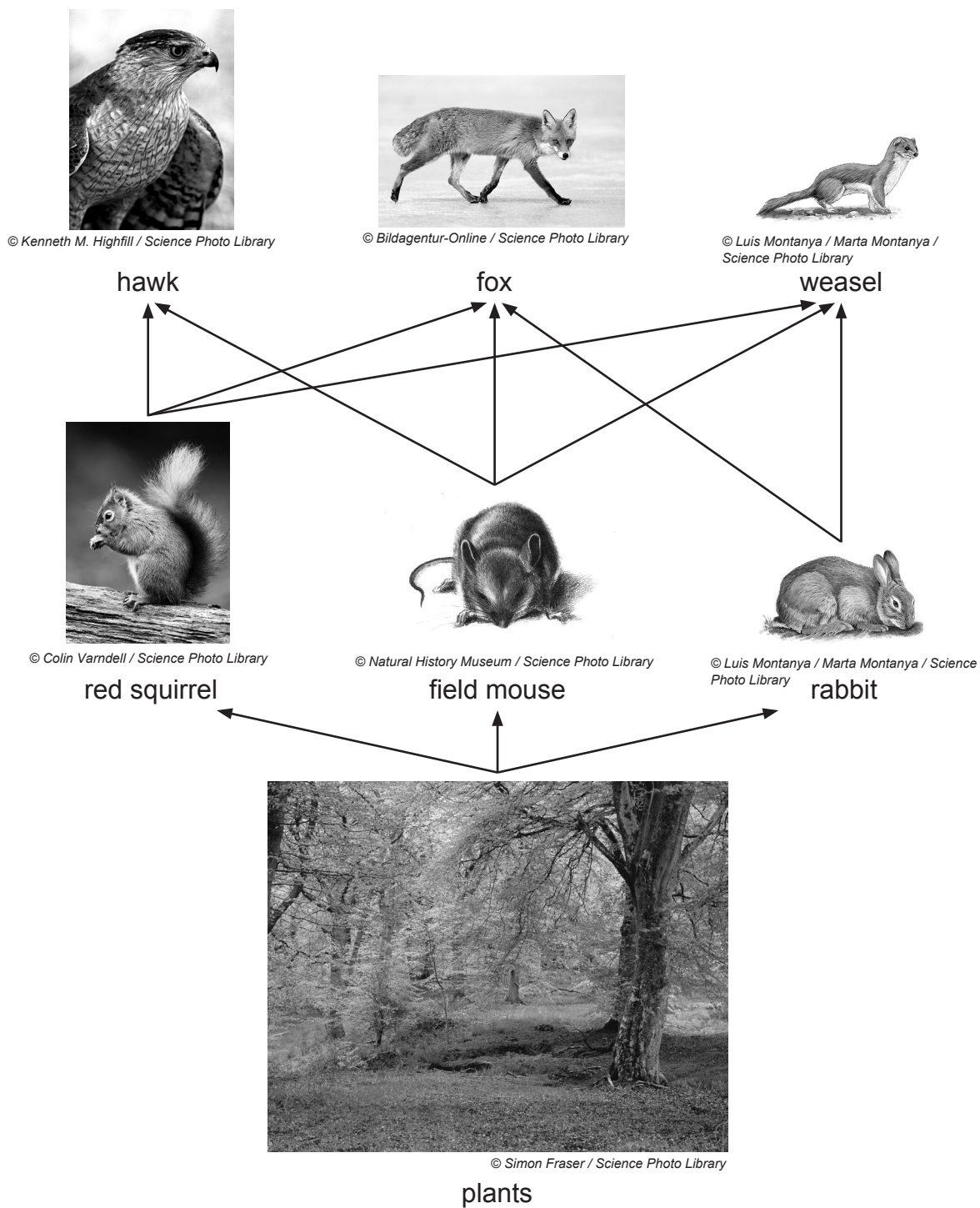
Food molecules	Smaller molecules they are made from	Main function in the body
Carbohydrates		
Fats		Energy store
Proteins		Growth and repair

[4]

[Turn over



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



(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]

[Turn over



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



© Martin Shields / Science Photo Library

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]



- 4 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 cm³ of starch solution.

They added 2 cm³ of amylase solution to tube **A**.

They added 2 cm³ 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



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

[illegible]

[6]

[Turn over

10401



32GBY1209

- 5 The table shows the mass of some gases released into the atmosphere between 2009 and 2013 in the UK.

Gas	Mass of gas released/thousand tonnes				
	2009	2010	2011	2012	2013
Sulfur dioxide	1042	1040	1015	972	894
Nitrogen oxides	563	581	527	563	479

Statistics from Office for National Statistics database "Acid Rain Precursor Emissions, United Kingdom" 1990 - 2013. Previous revision 05/07/16. © Crown Copyright - Contains public sector information licensed under the Open Government Licence v3.0

- (a) Give **one similarity** and **one difference** in the trend in mass of sulfur dioxide and nitrogen oxides between 2009 and 2013.

Similarity _____

Difference _____

_____ [2]

- (b) Factories and power stations release large masses of sulfur dioxide into the atmosphere.

Describe how this sulfur dioxide is produced.

_____ [2]



(c) Describe how sulfur dioxide in the atmosphere can lead to acid rain.

[2]

(d) Describe and explain how acid rain affects the biodiversity of a forest ecosystem.

[2]

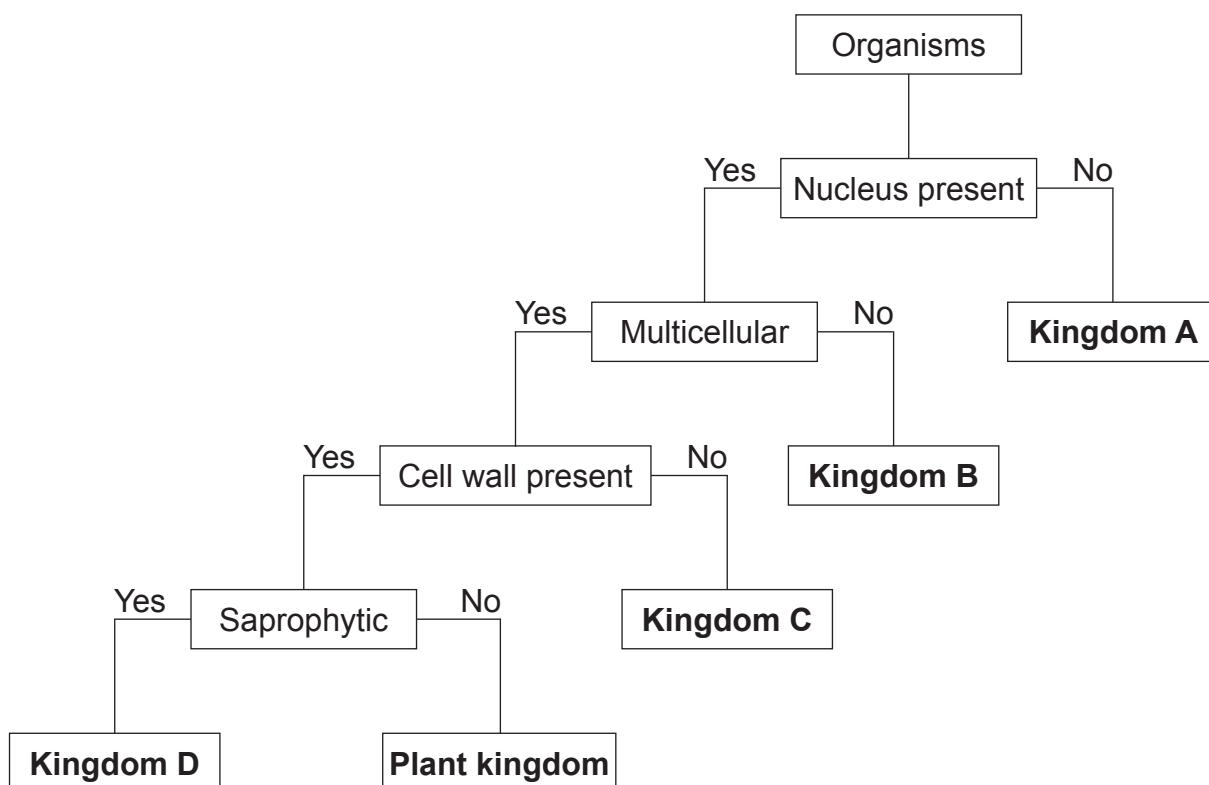


6 Classification is used to identify different species of organisms.

(a) What is a species?

[2]

(b) This key can be used to classify organisms into five kingdoms.



Use the key to identify the kingdoms **A**, **B**, **C** and **D**.

Kingdom **A** _____

Kingdom **B** _____

Kingdom **C** _____

Kingdom **D** _____

[4]



(c) Give **two other** uses for classification.

1. _____
_____ [1]

2. _____
_____ [1]



- 7 (a) An experiment was set up to investigate the growth of two crops of a plant of the same species under different conditions.

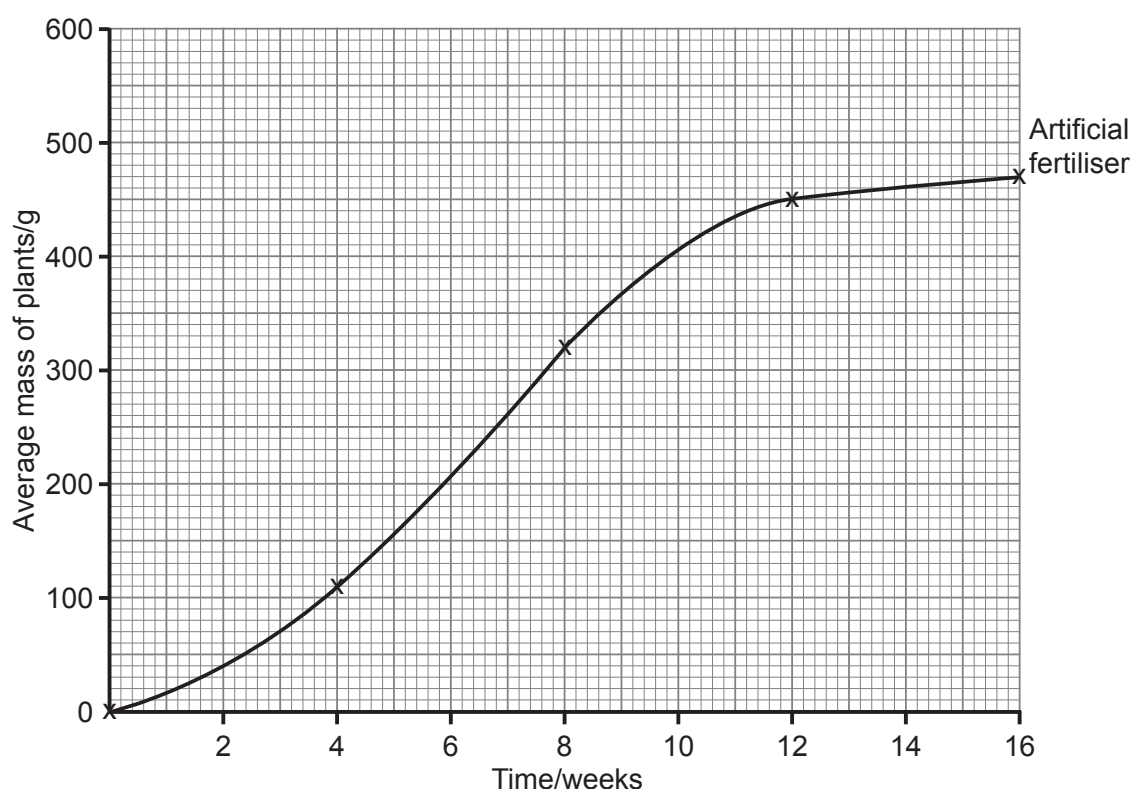
Artificial fertiliser was applied to one and manure to the other.

The table shows the results.

Time/weeks	Average mass of plants/g	
	Artificial fertiliser	Manure
0	0	0
4	110	50
8	320	160
12	450	340
16	470	450

- (i) Complete the graph by plotting the results for manure.

[3]



The plants must reach an average mass of 400g before they can be harvested.

(ii) How long does it take the plants to reach this mass?

Artificial fertiliser _____ weeks [1]

Manure _____ weeks [1]

(iii) Explain why the plants grow slower when manure is applied.

 [2]

(b) Suggest why adding manure is beneficial to the soil.

 [1]

(c) Give **two** advantages to the grower of using artificial fertiliser.

 [2]

[Turn over



8 When the blood glucose concentration rises the pancreas helps return it to its normal concentration.

(a) Describe the role of the **pancreas** in lowering the blood glucose concentration.

[2]

(b) Describe how the liver helps lower the blood glucose concentration.

[3]

(c) Name the hormone which helps correct the blood glucose concentration when it falls too low.

[1]

[Turn over



9 Doctors use Body Mass Index (BMI) to check if a person has a healthy weight.

(a) Complete the equation for the calculation of BMI by writing in the box.

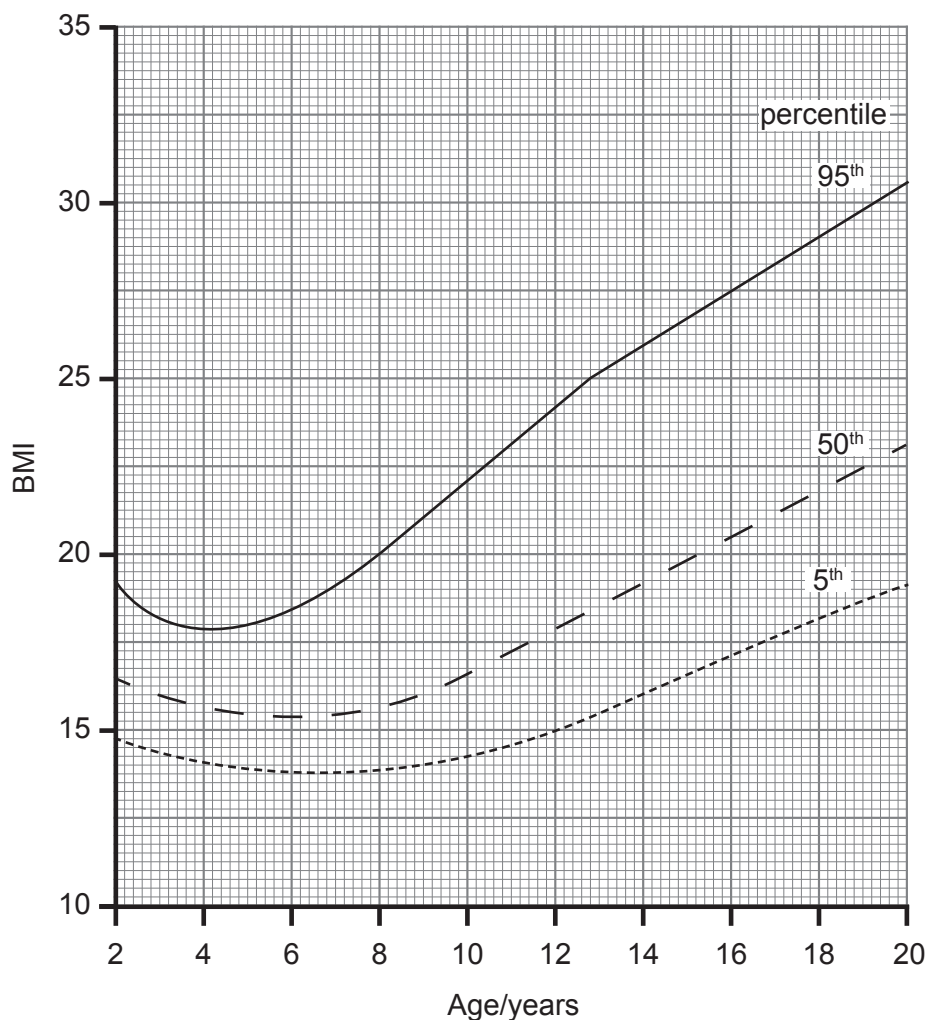
BMI = Mass/g

[2]

(b) The graph shows the range of BMI values for boys aged 2 years to 20 years in a population.

The 50th percentile shows the average BMI for the population.

Boys with a BMI on or above the 95th percentile are described as obese.



© CDC - Graph data developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health <https://www.cdc.gov/growthcharts/>

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32GBY1218

(i) What is the average BMI of a 10-year-old boy?

[1]

(ii) Describe the trend in the BMI for boys between 2 and 20 years.

[2]

(iii) From what age would a boy with a **BMI** of 20 or above be described as obese?

[1]

(iv) Describe how an energy imbalance can lead to obesity.

[1]

(v) Explain why obesity is a problem to both the individual and to society.

Individual _____

Society _____

[2]

[Turn over



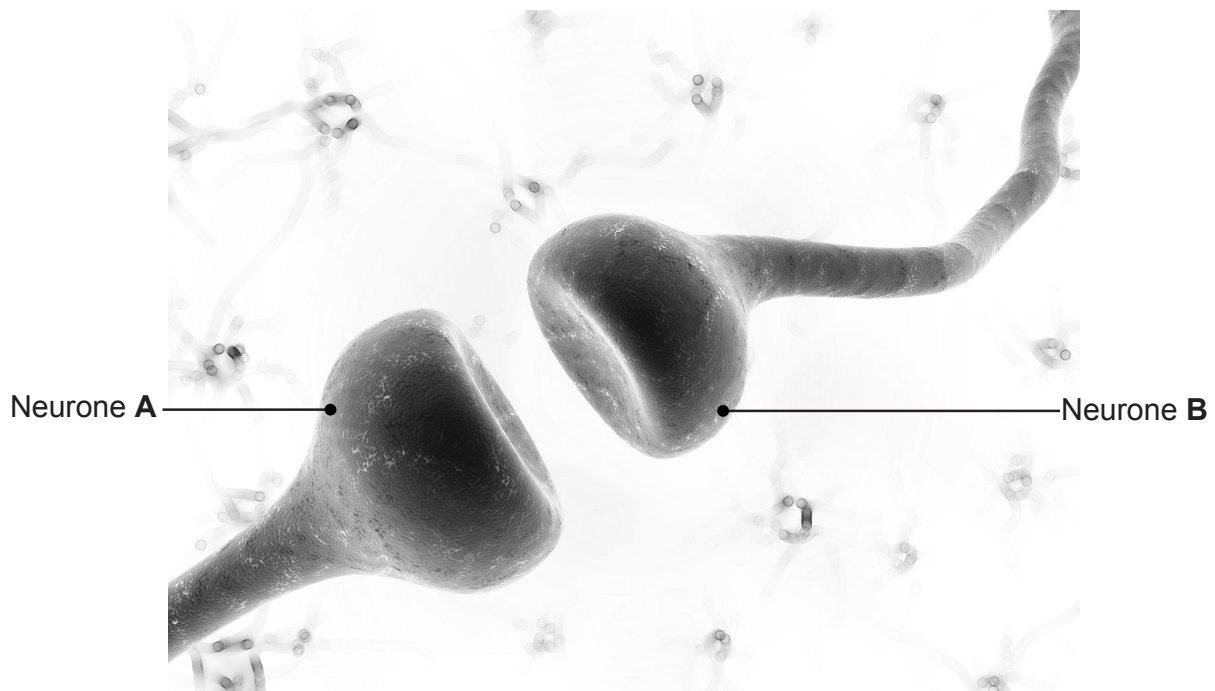
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10 The image shows a junction between two neurones **A** and **B**.



© Sebastian Kaulitzki / Science Photo Library

(a) (i) Name this junction.

[1]

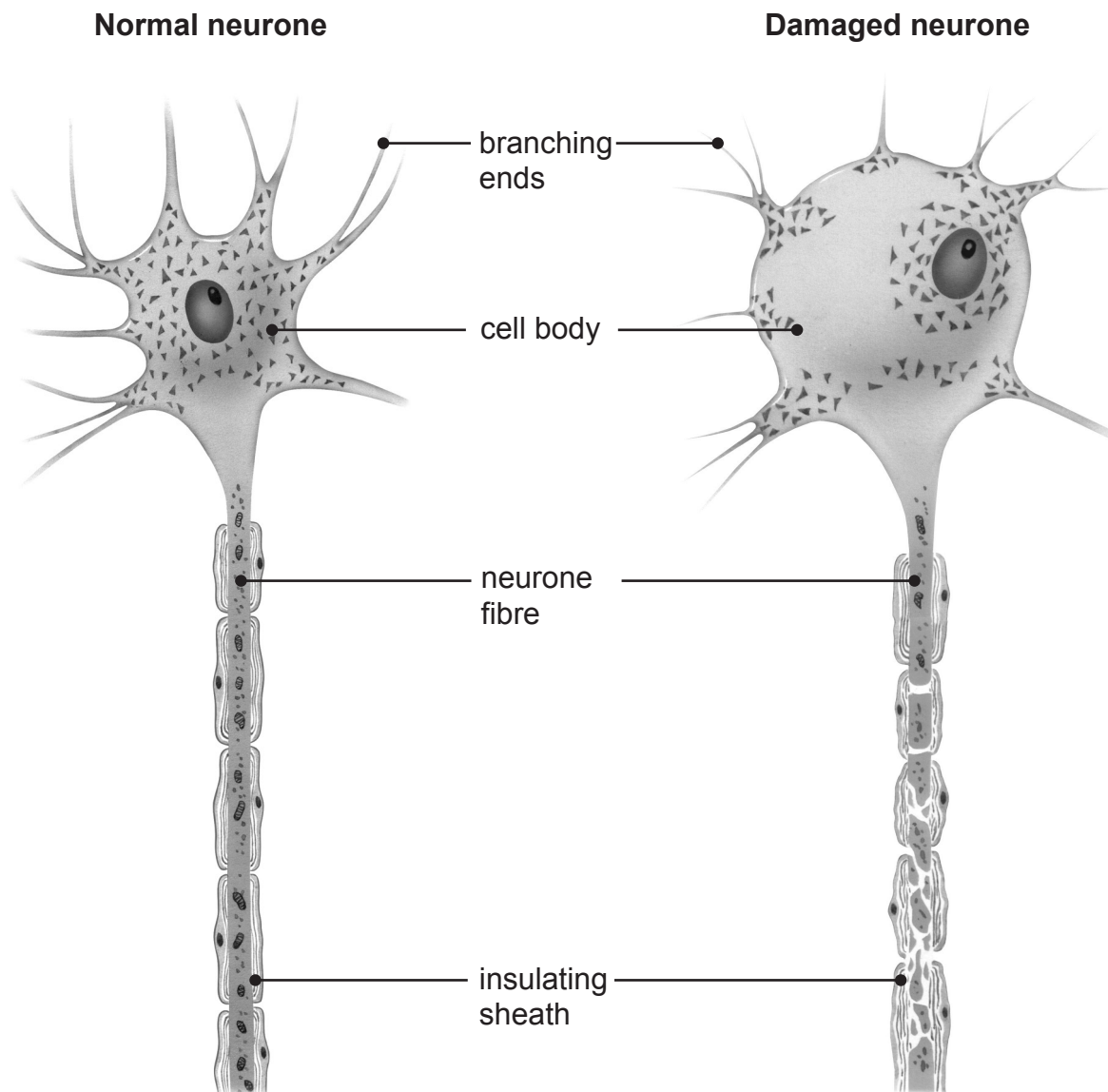
(ii) Describe how a nerve impulse travels from neurone **A** to neurone **B**.

[4]

[Turn over]



- (b) The diagram shows a normal neurone and a damaged neurone from a person suffering from multiple sclerosis.



© JFalcetti / iStock / Thinkstock

- (i) Describe how these neurones are adapted to make connections with other neurones.

[1]



(ii) Describe **two** ways multiple sclerosis damages the structure of a neurone.

1. _____

2. _____

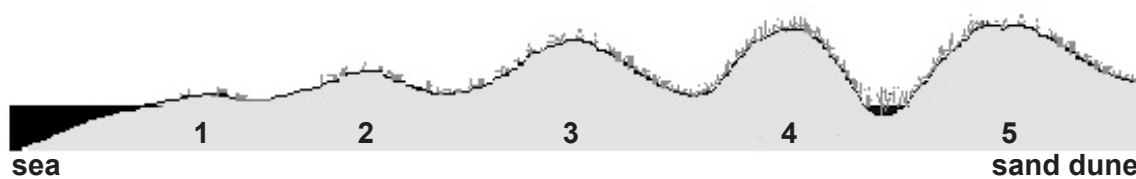
_____ [2]

(iii) Suggest **one** effect of multiple sclerosis on the function of the nervous system.

_____ [1]

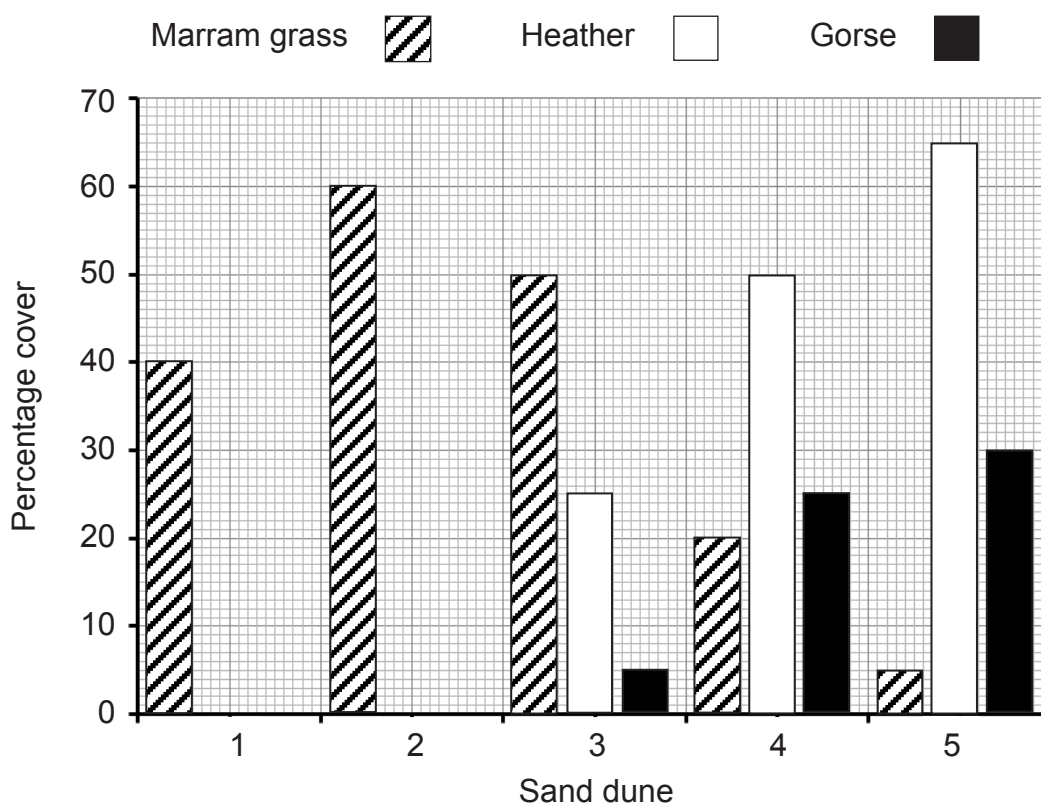


11 Sand dunes are found at the top of many beaches.



Students carried out an investigation to measure the percentage cover of three plant species, marram grass, heather and gorse growing on five sand dunes.

The graph shows the results.



- (b) The students also measured some abiotic factors on each sand dune.

The table shows the results.

Sand dune	Abiotic factor/arbitrary units			
	Soil water	Wind speed	Soil humus	Light intensity
1	6	15	4	16
2	7	7	5	22
3	15	18	9	19
4	28	12	22	18
5	42	17	37	25

- (i) Use information from the graph and the table to suggest which of the abiotic factors affect the growth of heather and gorse.

Place a tick in the appropriate boxes.

Soil water

☐

Soil humus

☐

Wind speed

☐

Light intensity

☐

[2]

- (ii) Suggest an explanation for the change in the humus content of the soil on sand dunes 3, 4 and 5.

Use evidence from the graph and the table to support your answer.

[2]





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10401

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32GBY1227

12 (a) Plants use nitrates for growth.

(i) Describe how plants absorb nitrates.

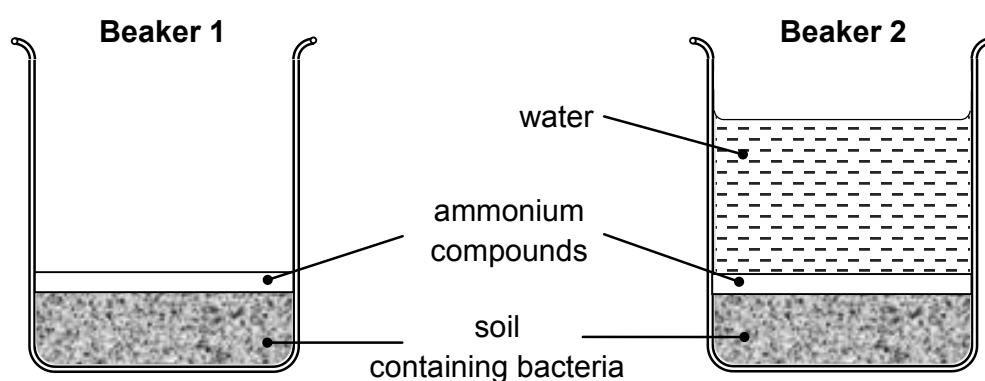
[3]

(ii) Describe how plants are adapted to absorb nitrates.

[2]

(b) A student set up an experiment to investigate the effect of waterlogging on some of the processes in the nitrogen cycle.

He set up two beakers as shown in the diagrams.



© CCEA



The student measured the concentration of ions in each beaker at the start and after 24 hours.

The table shows the results.

Beaker	Ion	Concentration of ions/arbitrary units	
		at start	after 24 hours
1	ammonium	600	550
	nitrates	90	140
2	ammonium	600	595
	nitrates	90	95

In **beaker 1** the ammonium compounds are being converted to nitrates.

(i) Name this process.

[1]

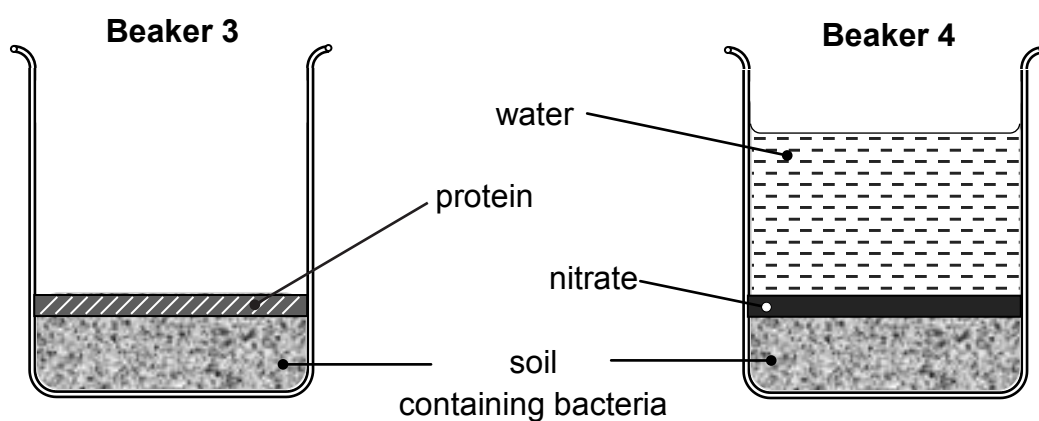
(ii) Use the results for **beakers 1 and 2** to describe and explain the effect of waterlogging on this process.

[3]

[Turn over]



The student set up two more beakers as shown in the diagrams.



The student measured the concentration of ions in each of these beakers at the start and after 24 hours.

The table shows the results.

Beaker	Ion	Concentration of ions/arbitrary units	
		at start	after 24 hours
3	ammonium	30	120
	nitrates	90	90
4	ammonium	30	30
	nitrates	200	120



(iii) Explain the results for **beakers 3 and 4**, and name the process occurring in each beaker.

Use **data** from the table to support your answer.

Beaker 3 _____

_____ [3]

Beaker 4 _____

_____ [3]

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For Examiner's use only	
Question Number	Marks
1	
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Total Marks	
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Examiner Number

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