Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2015–2016

Double Award Science: Biology

GSD11

Unit B1
Foundation Tier

[GSD11]

WEDNESDAY 24 FEBRUARY 2016, MORNING

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all nine** 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 **9(a)**.

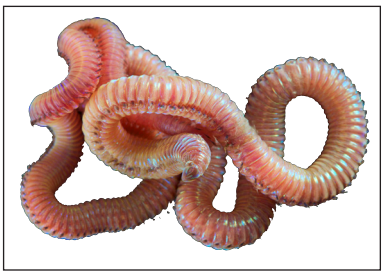
For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

Examiner Only	
Marks	Remark

1 The photographs show four organisms.

Draw a line to link each organism with its feature.

Organism	Feature
annelid	has an exoskeleton
flowering plant	is segmented
insect	has a backbone
chordate	produces seeds



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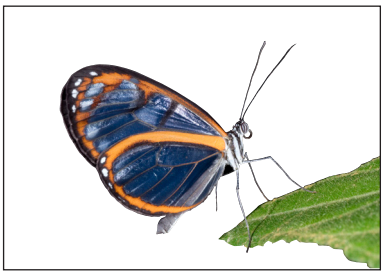

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[3]

Examiner Only	
Marks	Remark

2 **(a)** There is increasing international concern about global warming. Complete the passage below about global warming by writing the correct words in the spaces.

Choose the words from the list.

sound	**sulfur dioxide**	**light**
heat	**carbon monoxide**	**carbon dioxide**

Some gases in the atmosphere help keep the Earth warm.

One of these gases is _____ _____.

If the level of this gas in the atmosphere increases, it may lead to global warming. This is because it causes more _____ energy from the Sun to be trapped within the atmosphere. [2]

(b) The four statements below are about the causes and the effects of global warming.
In the box beside each statement, write the letter **C** if it is a **cause** of global warming or the letter **E** if it is an **effect** of global warming.

Statements

cutting down trees in forests ☐

rise in sea levels ☐

changes in weather patterns ☐

burning of fossil fuels ☐ [3]

Examiner Only	
Marks	Remark

3 **(a)** What does the term habitat mean?

_____

_____ [1]

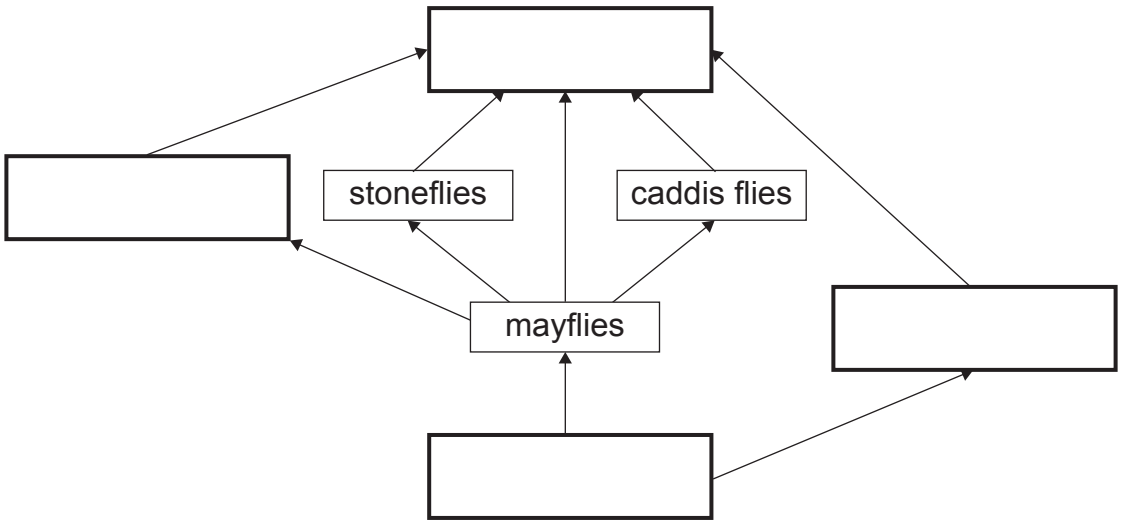
(b) Three food chains from a river habitat are shown below.

algae → river limpets → trout

algae → mayflies → trout

algae → mayflies → dragonflies → trout

(i) Use the information from the three food chains to complete the food web.



[4]

(ii) Name the producer in this food web.

_____ [1]

(iii) Name the organism that is feeding at two trophic levels.

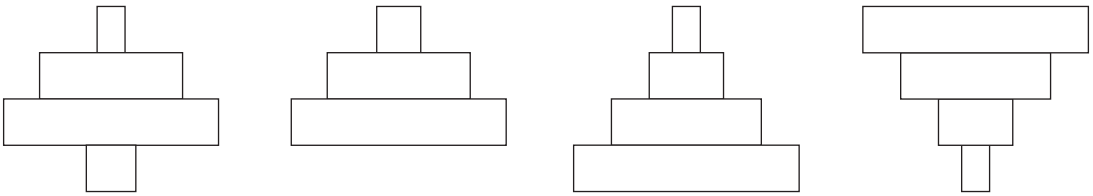
_____ [1]

Examiner Only	
Marks	Remark

(iv) One of the food chains from the river habitat is shown.

algae ⟶ mayflies ⟶ dragonflies ⟶ trout

Draw a circle around the pyramid of **biomass** for this food chain.



[1]

(c) The photograph shows a river flowing past a farmer's field.

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The farmer used artificial fertiliser to increase his crop yield. If large amounts of this artificial fertiliser run off into the river, biodiversity in the river would be affected.

(i) What does the term biodiversity mean?

_____

_____ [1]

(ii) Artificial fertiliser is more likely to run off into the river than natural fertiliser.
Suggest why.

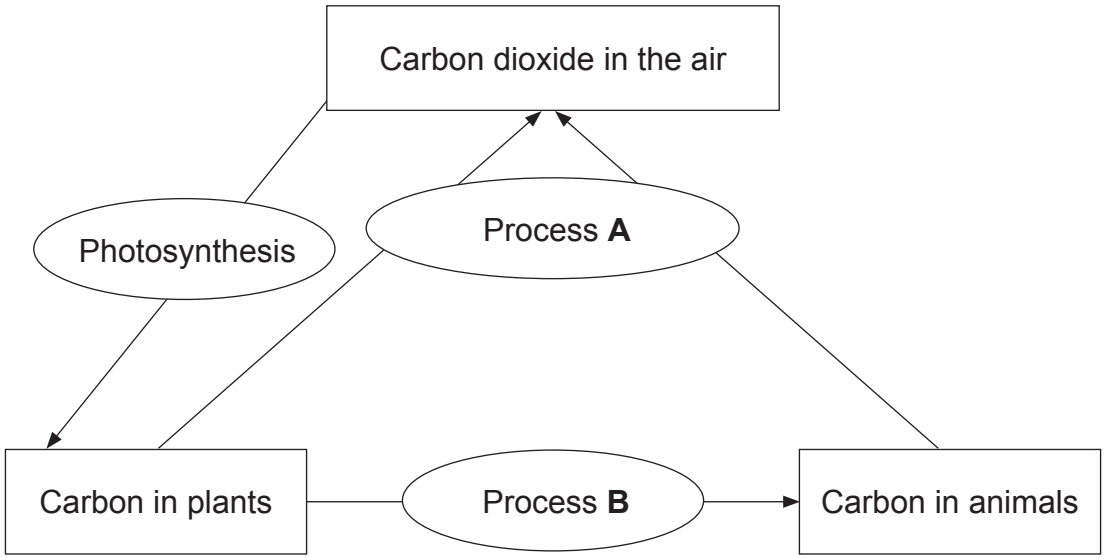
_____

_____ [1]

(iii) Give an example of a **natural** fertiliser the farmer could use to increase his crop yield.

_____ [1]

4 The diagram shows part of the carbon cycle.

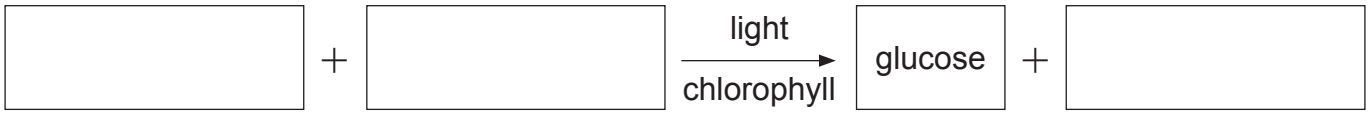


(a) Name processes **A** and **B**.

Process **A** _____

Process **B** _____ [2]

(b) **(i)** Complete the equation for photosynthesis by writing in the boxes below.



[3]

(ii) Give **one** way plants use glucose.

_____

_____ [1]

Examiner Only

Marks	Remark

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(Questions continue overleaf)

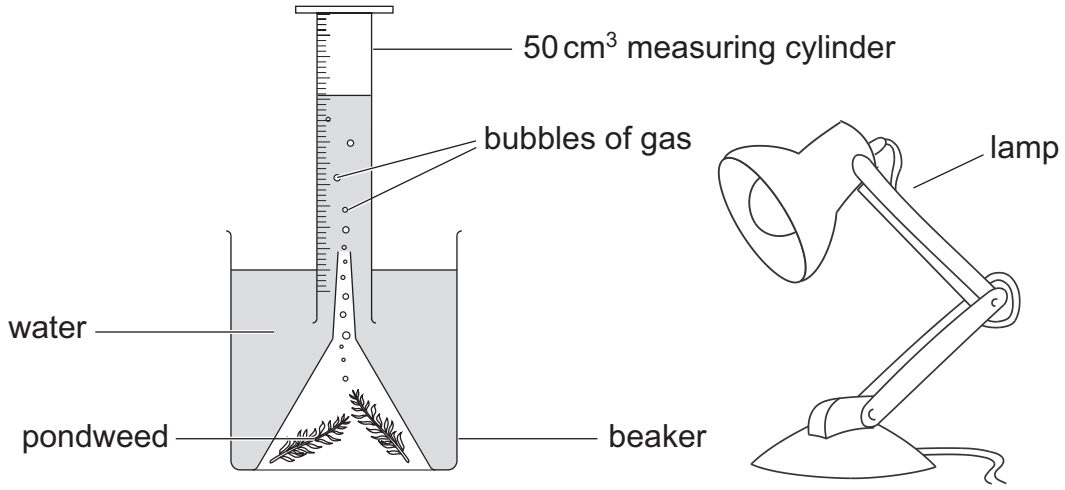
Examiner Only	
Marks	Remark

5 **(a)** Two students carried out an experiment to investigate the effect of light intensity on photosynthesis.

Emma placed a lamp at different distances from the beaker containing pondweed. She recorded the volume of gas collected in **1 minute** at each distance.

Tom repeated the experiment but recorded the volume of gas collected in **10 minutes** at each distance.

The diagram shows the apparatus they used.

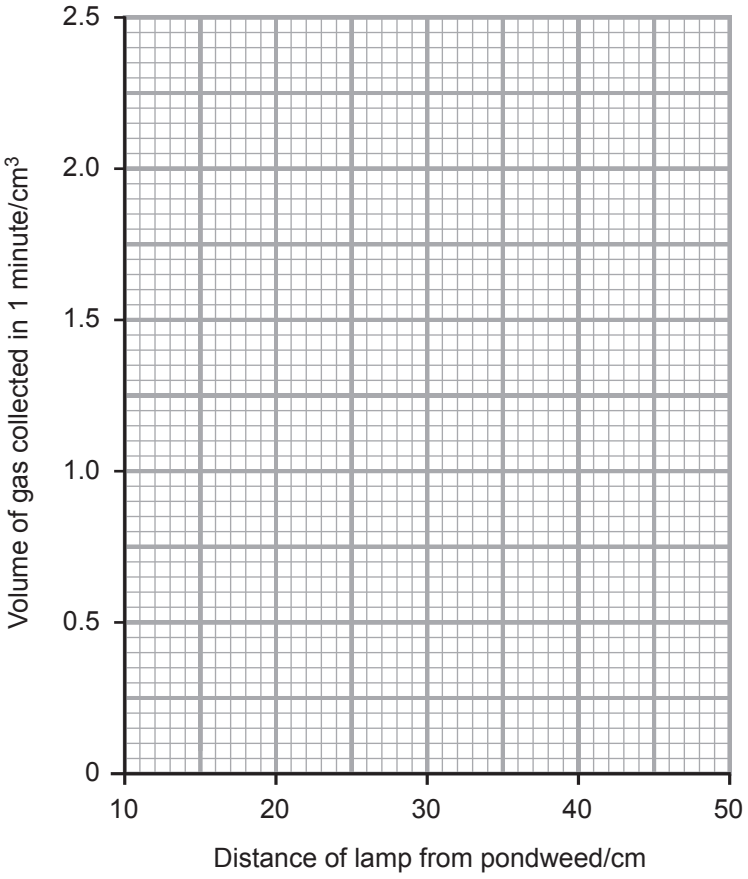


Source: Principal Examiner

The table shows Emma's and Tom's results.

Distance of lamp from pondweed/cm	Emma – volume of gas collected in 1 minute/cm^3	Tom – volume of gas collected in 10 minutes/cm^3
10	2.4	22.7
20	1.0	12.0
30	0.6	6.0
40	0.5	5.5
50	0.4	4.5

(i) Draw a line graph on the grid to show Emma's results.



[3]

(ii) The results from both students show the same trend.
Describe and explain this trend.

_____

_____

_____

_____

_____

_____ [3]

(iii) One distance of the lamp from the pondweed gave the **same rate** of photosynthesis for both students' experiments.

Use data from the table to give this distance.

_____ cm [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

(iv) Each time the students moved the lamp to a different distance, they waited for two minutes before starting to collect the gas.

Suggest why they did this.

_____

_____

_____ [1]

(b) (i) Emma suggested **two** improvements to their experiments.

These are given below.

A: Use a 25 cm^3 measuring cylinder instead of a 50 cm^3 measuring cylinder.
B: Repeat the experiment three times.

Explain how each of these suggestions would improve the experiment.

A: _____

_____

_____

B: _____

_____

_____ [2]

(ii) Tom suggested placing a large beaker of cold water between the lamp and the pondweed to absorb heat from the lamp.

Suggest how this would improve the experiment.

_____

_____

_____ [1]

6 Rebecca tested each of three solutions, **A**, **B** and **C**, with Benedict's reagent, Biuret reagent and iodine solution.

One solution contained only starch, one contained only protein and one contained only glucose.

She recorded positive results with a tick ✓.
She recorded negative results with a cross ✗.

The table shows her results.

Solution	Benedict's test result	Biuret test result	Iodine test result	Name of substance present
A	✓	✗	✗	
B	✗	✗	✓	
C	✗	✓	✗	

(a) Complete the table by writing in the name of the substance present in each solution. [3]

(b) **(i)** Describe how Rebecca carried out the Benedict's test.

_____

_____

_____

_____ [2]

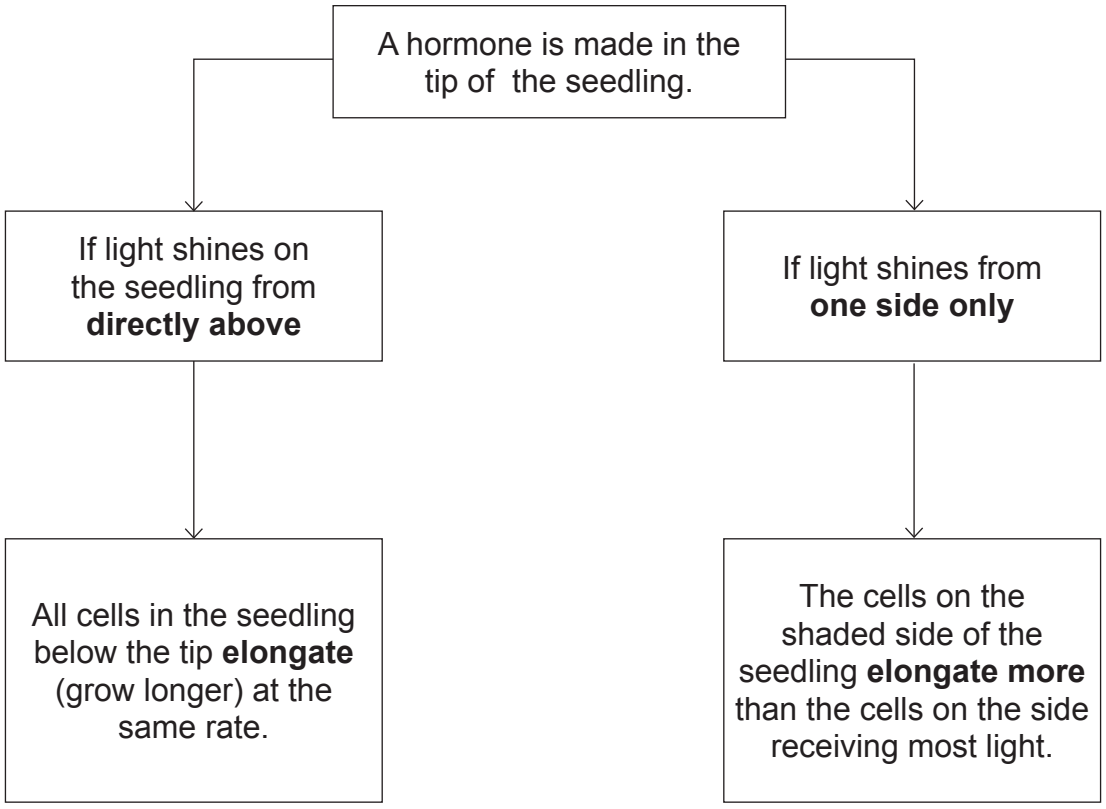
(ii) Give the colour change that shows a positive result for the Benedict's test.

_____ to _____ [1]

Examiner Only
Marks | Remark

7 The growth of a seedling is affected by the direction from which light shines on it.

The flow diagram describes a seedling's growth response to light.



(a) (i) Name the seedling's growth response to light.

_____ [1]

(ii) Name the plant hormone that causes this growth response in the seedling.

_____ [1]

(iii) Explain the advantage to the seedling of this growth response to light.

_____

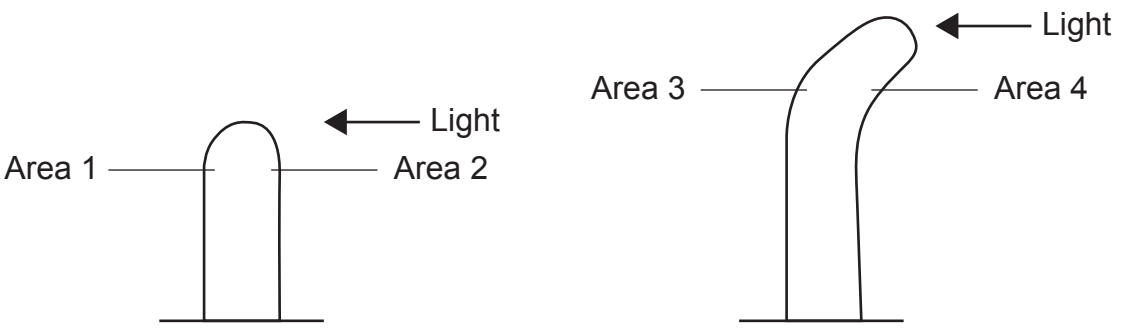
_____

_____ [2]

Examiner Only

Marks	Remark

(b) The diagram shows how shining a light from **one side only** affects the growth of a seedling.

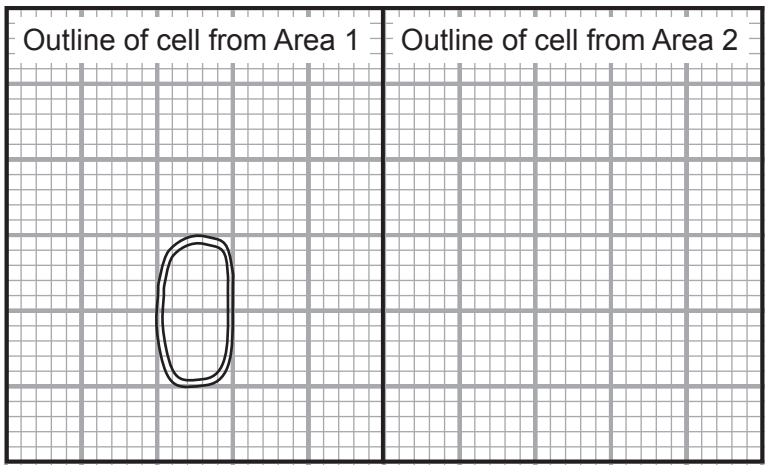


At start **After two days**

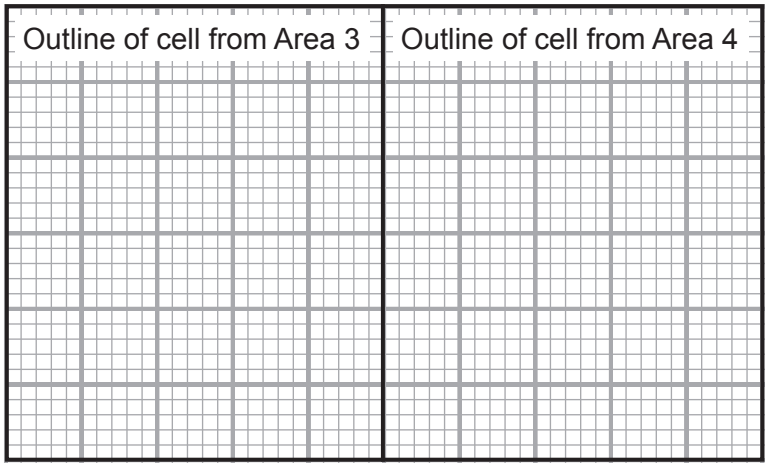
The outline of a cell from Area 1 has been drawn below.

Use the flow diagram opposite and the diagram above to help draw the outlines of cells from Areas 2, 3 and 4 on the grids.

At start



After two days



[3]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

8 **(a)** **(i)** What is an enzyme?

_____

_____

_____ [2]

Protease is an enzyme found in the digestive system. It breaks down protein in the stomach.

(ii) Name another organ of the digestive system where protease is produced.

_____ [1]

(b) Why is digestion necessary?

_____

_____

_____

_____ [2]

(c) **Diagram 1** below shows the shape of a stomach protease molecule in acid and in alkali.

The shape of albumin which is a protein molecule is also shown.

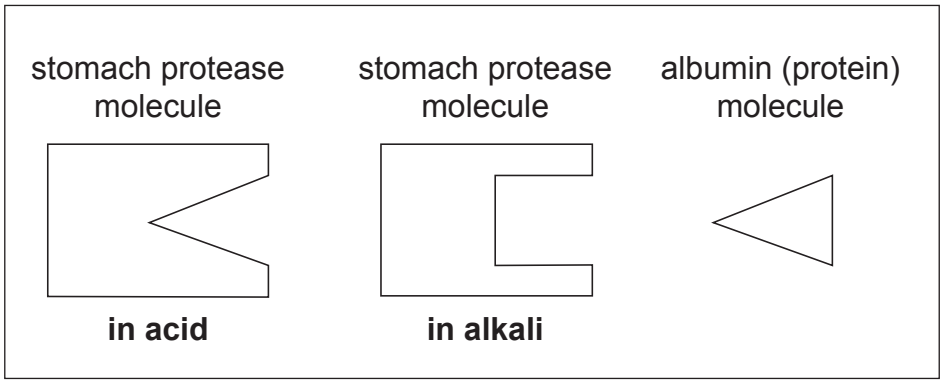


Diagram 1

When albumin is added to water it makes a cloudy solution. If the albumin in the solution is broken down by stomach protease, the cloudy solution goes clear.

David tested the effect of adding stomach protease to albumin in **acid** and in **alkali**.

Diagram 2 below shows the results of his experiment.

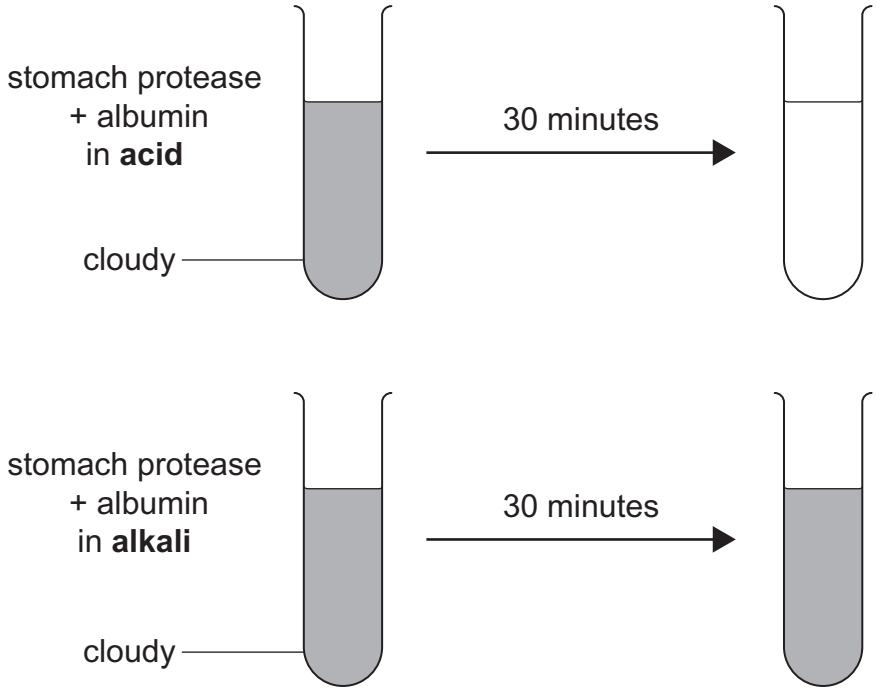


Diagram 2

(i) Use the information in **Diagram 2** to describe the results of David's experiment.

_____

_____ [1]

(ii) Use the information in **Diagrams 1 and 2** and your knowledge of enzyme action to explain the results of David's experiment in **acidic** conditions.

_____

_____

_____ [2]

(iii) Use the information in **Diagrams 1 and 2** and your knowledge of enzyme action to explain the results of David's experiment in **alkaline** conditions.

_____

_____

_____ [2]

Examiner Only

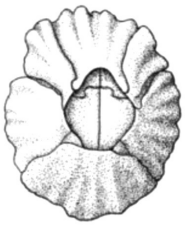
Marks	Remark

Examiner Only	
Marks	Remark

9 Barnacles are small animals that live inside shells attached to rocks on shores.

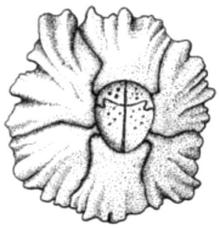
A scientist investigated the distribution of two different species of barnacle, **A** and **B**, on a rocky shore.

The drawings show the two species of barnacle.
The photograph shows the rocky shore he sampled.



Species **A**

© Rocky Shore Animals, Nature in Shetland. http://www.nature-shetland.co.uk/brc/rocky.htm



Species **B**

© Rocky Shore Animals, Nature in Shetland. http://www.nature-shetland.co.uk/brc/rocky.htm

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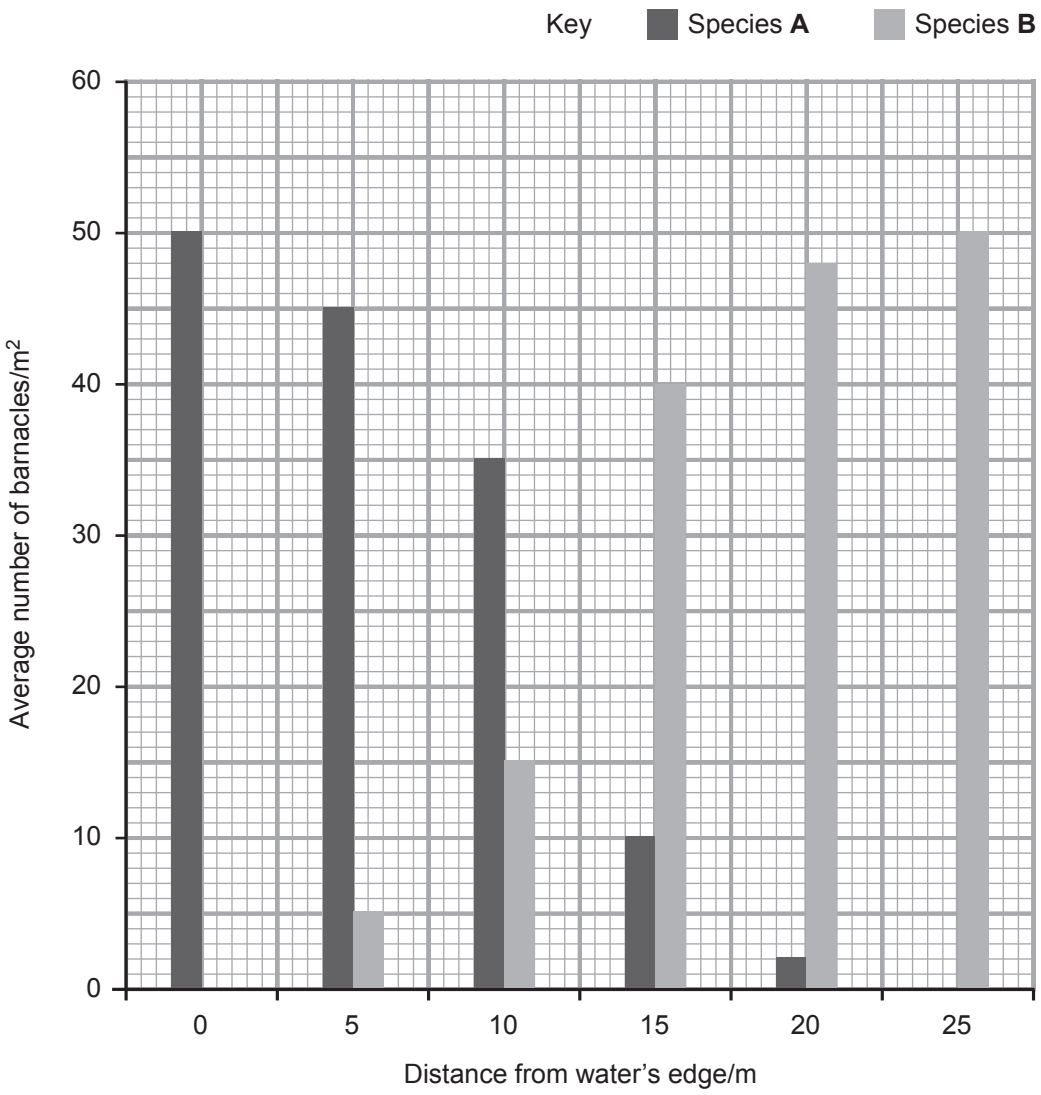
(a) Describe how the scientist sampled the rocky shore.

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

Examiner Only	
Marks	Remark

[6]

(b) The bar chart shows his results.



(i) The scientist had predicted that the numbers of species **A** would decrease with increasing distance from the water's edge.

Give **two** pieces of data from the bar chart that support this prediction.

_____

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

Using the data from his bar chart, the scientist calculated the **percentage** of barnacles belonging to each species at each distance from the water's edge.

The table shows these percentages.

Distance from water's edge/m	Percentage of barnacles present	
	Species A/%	Species B/%
0	100	0
5	90	10
10	70	30
15	20	80
20		
25	0	100

(ii) Complete the table by using data from the bar chart to calculate the **percentage** of barnacles of species **A** and species **B** at 20 metres from the water's edge.

Show your working.

[3]

Examiner Only

Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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