Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2024

Biology

Unit 3 Practical Skills
Booklet B
Higher Tier

[GBL34]

GBL34

THURSDAY 20 JUNE, MORNING

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 seven** 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(c)**.

13882

24GBL3401

1 **(a)** Bacteria cause milk to turn sour.

The bacteria feed on the sugar in the milk and produce lactic acid.

(i) Name the sugar present in milk.

_____ [1]

(ii) Name the type of respiration which produces lactic acid.

_____ [1]

The table shows the pH of a sample of milk left at room temperature for four days.

Day	pH of milk
1	6.7
2	6.5
3	6.0
4	5.3

Source: Principal Examiner

(b) Describe and explain the trend shown in the table.

No data is needed in your answer.

Description _____

_____

Explanation _____

_____

_____

_____ [3]

(c) Describe and explain how the results would differ if the milk was left in a fridge for four days.

Description _____

_____

Explanation _____

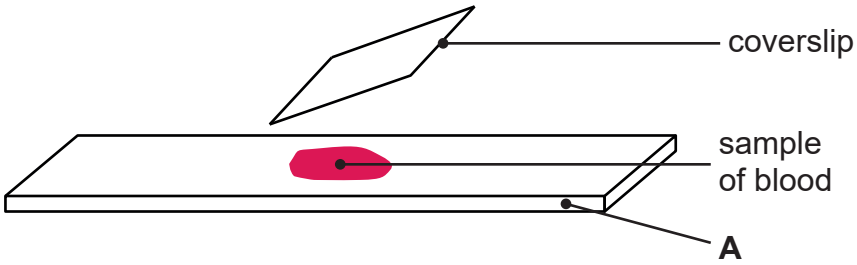
_____

_____

_____ [3]

[Turn over

2 **(a)** The diagram shows how a scientist prepared a sample of blood for viewing under a microscope.



Source: Principal Examiner

(i) Name part **A**.

_____ [1]

When preparing the sample of blood, the coverslip is gently lowered at an angle.

(ii) Explain why.

_____

_____ [1]

(iii) Why is the microscope stage moved **away** from the objective lens when focusing?

_____

_____ [1]

(iv) What else must be adjusted on the microscope to get a clear view of the blood sample?

_____ [1]

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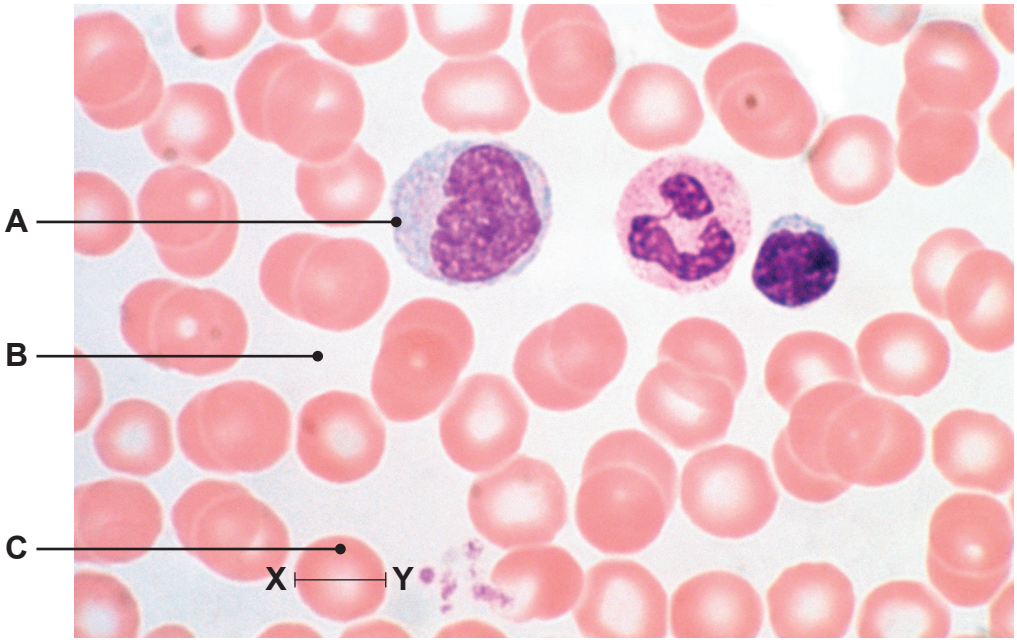
(Questions continue overleaf)

(b) The photograph shows the sample of blood viewed under a microscope.



Source: © Biophoto Associates / Science Photo Library

(i) Name cells **A** and **C** and liquid **B**.

A _____

B _____

C _____ [3]

(ii) Measure the diameter **in mm** of cell **C** along the line **XY**.

_____ mm [1]

The photograph is magnified 1500 times.

(iii) Calculate the actual diameter of cell **C**.

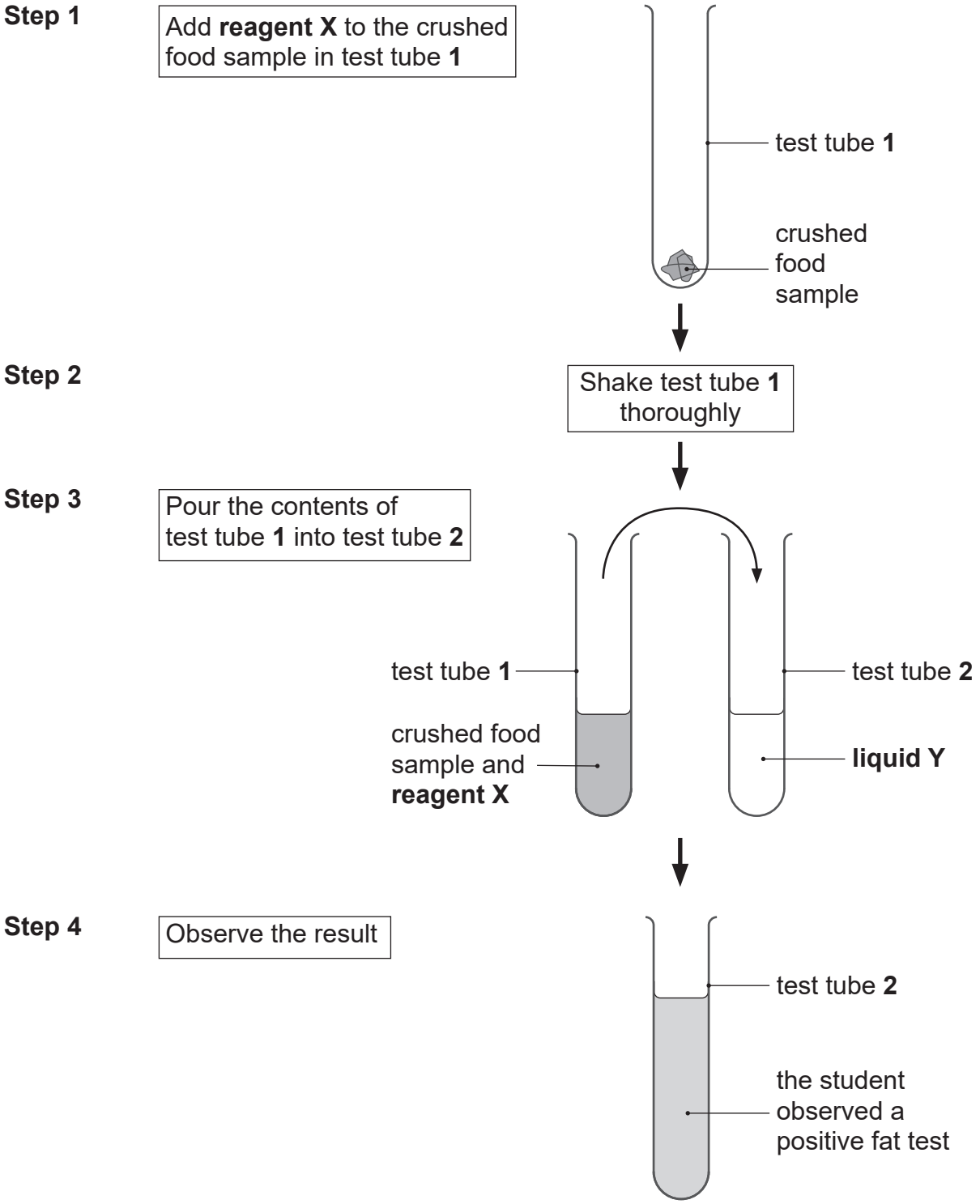
Give your answer in **micrometres**.

Show your working.

Diameter _____ micrometres [4]

3 A student tested a food sample for the presence of fat.

The diagram shows the method he used.



Source: Principal Examiner

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(a) Give the name of

reagent X. _____

liquid Y. _____ [2]

(b) Suggest why test tube **1** was thoroughly shaken in **step 2**.

_____

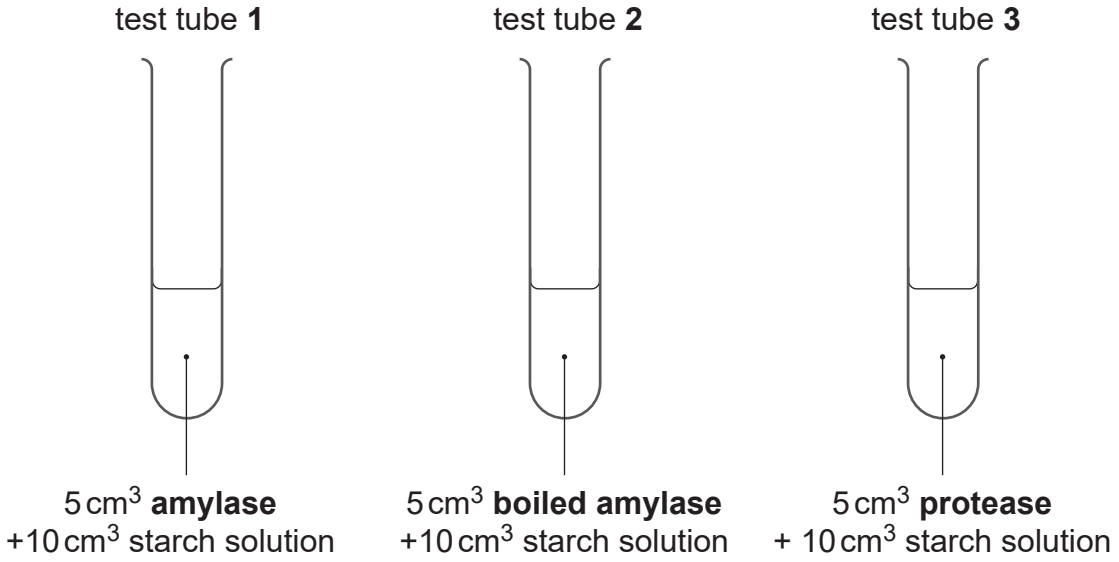
_____ [1]

(c) Describe the colour change observed by the student in **step 4**.

From _____ to _____ [2]

4 A student carried out an experiment to investigate the action of amylase and protease on starch solution.

The diagram shows her experiment.



Source: Chief Examiner

After 20 minutes, the student removed a sample from each test tube and tested each sample with iodine solution.

The table shows her results.

Test tube	**Colour of iodine solution when added to each sample after 20 minutes**
1	yellow-brown
2	blue-black
3	blue-black

(a) Describe what happened to the starch in test tube **1**.

_____

_____

_____

_____ [2]

(b) Explain the result for test tube **2**.

_____

_____

_____

_____ [2]

(c) Use your knowledge of **enzyme action** to explain the result for test tube **3**.

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

_____

_____

_____

_____

_____

_____

_____

_____

_____

[6]

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(Questions continue overleaf)

5 A group of pupils carried out an experiment to compare the water loss from a leaf with the water loss from a damp piece of paper.

The pupils used the leaf as a template to cut out a leaf-shaped piece of paper.

They added a few drops of water to the paper.

The pupils weighed the leaf and the damp paper before hanging them up in a dry atmosphere at 25°C.

They recorded the mass of the leaf and the damp paper after 4 hours.

They calculated the percentage decrease in mass of the leaf and damp paper.

The table shows the pupils' results.

	Mass / g		**Percentage decrease in mass**
	At the start	**After 4 hours**	
Leaf		8.4	20.0
Damp piece of paper	9.5	5.7	40.0

Source: Principal Examiner

(a) Complete the table by calculating the mass of the leaf at the start.

Show your working.

[2]

(b) Give the variable which was controlled by using the leaf as a template to cut out the piece of paper.

_____ [1]

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(c) Unlike damp paper, leaves are adapted to reduce water loss.

(i) Calculate the **rate** of water loss from the damp paper.

Include units in your answer.

Show your working.

_____ [3]

(ii) Describe and explain **two** reasons why the leaf lost **less** water than the damp paper.

Description _____

_____

Explanation _____

_____

Description _____

_____

Explanation _____

_____ [4]

(d) Give **two** environmental factors which could **increase** the rate of water loss from the damp paper.

1. _____

2. _____ [2]

[Turn over

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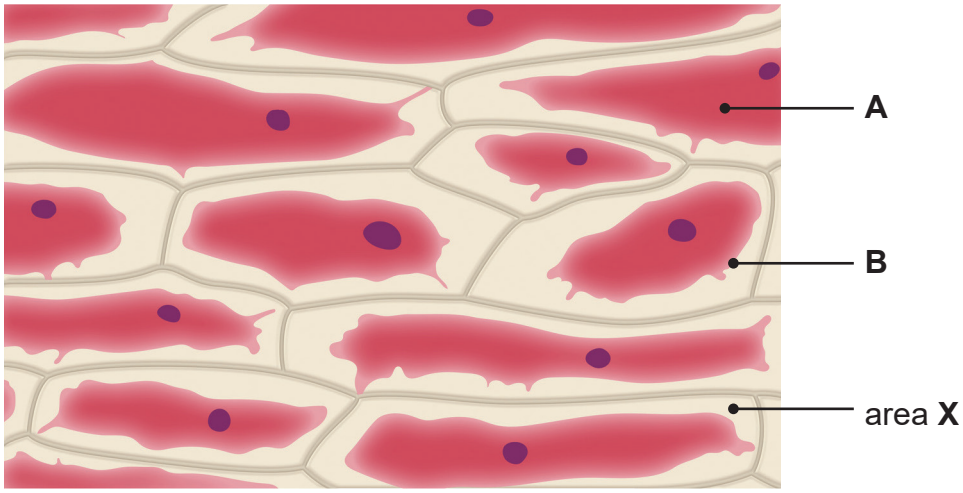
6 **(a)** A group of pupils investigated osmosis by placing a layer of red onion cells in a range of concentrations of sugar solution from 0.0 M (water) to 1.0 M (concentrated sugar solution).

They left the layers of red onion cells in the sugar solutions for two hours.

After this time, they removed the layer of red onion cells from each solution and observed them under a microscope.

The photograph shows some red onion cells after two hours in 0.8 M sugar solution.



Source: © Getty Images

(i) Name parts **A** and **B**.

A _____

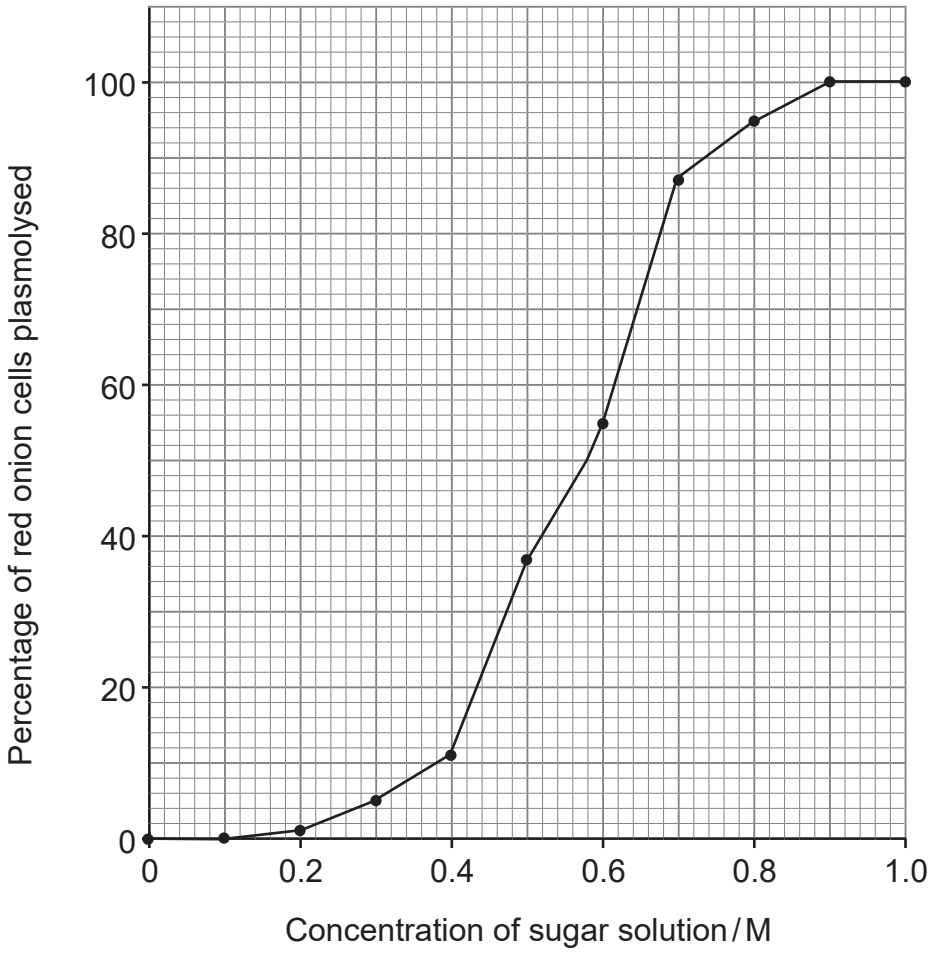
B _____ [2]

(ii) Suggest what was present in area **X**.

_____ [1]

(b) For each concentration of sugar solution, the pupils calculated the percentage of cells which had become plasmolysed.

The line graph shows their results.



Source: Chief Examiner

(i) Describe the **trend** shown in the graph.

No data is needed in your answer.

_____

_____

_____

_____ [2]

(ii) There was no plasmolysis of the red onion cells in 0.1 M sugar solution.

Explain why.

_____

_____

_____

_____

_____

_____

_____

_____ [4]

The concentration inside the red onion cells is equal to the concentration of the sugar solution when 50% of the cells are plasmolysed.

(iii) Use the graph to give the concentration inside the red onion cells.

_____ M [1]

(iv) Suggest **one** advantage of using **red** onion cells for this experiment.

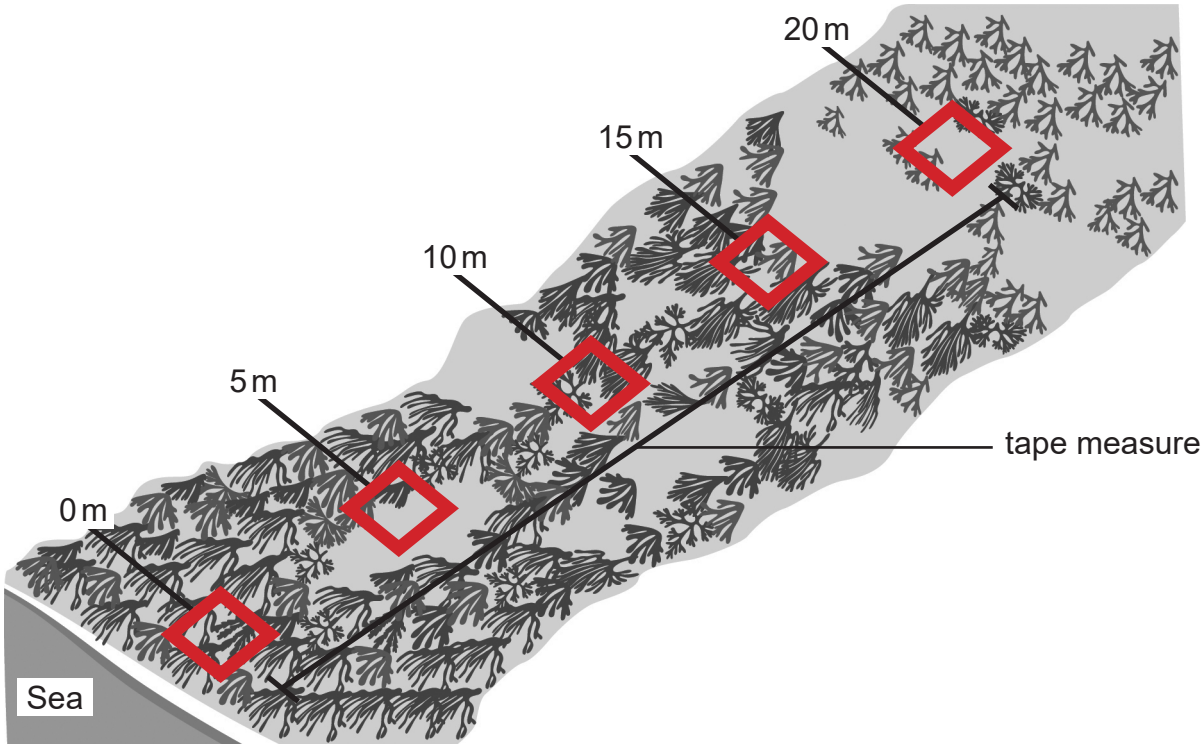
_____

_____ [1]

7 A group of pupils investigated the distribution of five seaweed species on a rocky seashore, using a line transect.

The investigation was carried out at low tide.

The distance of each sample position along the line transect is given in metres.



The table shows their results.

Distance of sample position along line transect / m	Percentage cover of seaweed species				
	Kelp	Saw wrack	Bladder wrack	Spiral wrack	Channelled wrack
0	85	15	0	0	0
5	10	70	10	0	0
10	2	10	80	8	0
15	0	0	25	70	0
20	0	0	0	0	20

Source: Principal Examiner

(a) Use the diagram to describe how the pupils carried out this line transect.

_____

_____

_____

_____

_____

_____

_____

_____ [4]

(b) **(i)** What ecological term describes the number of different seaweed species on this rocky seashore?

_____ [1]

(ii) Describe the trend in the number of different species from sample position **0 m to 20 m**.

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

_____

_____

_____

_____

_____

_____ [3]

(c) What evidence from the table suggests that there was bare rock in the 5 m sample?

_____

_____

_____ [1]

(d) Suggest which seaweed species is best adapted to survive drying out when exposed to the air.

Explain your answer.

_____

_____

_____

_____ [2]

Exposure to the air is an environmental factor.

(e) What name is given to this **type** of environmental factor?

_____ [1]

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Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
Total Marks	

Examiner Number

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