



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  
Foundation Tier

[GSD11]



**WEDNESDAY 21 FEBRUARY 2018, 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 **7(b)**.

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

1 During fieldwork Adam collected some small animals.

The images A to E below show these animals.



**A**

© bazilfoto / iStock / Thinkstock



**B**

© AlekZotoff / iStock Thinkstock



**C**

© marcouliana / iStock / Thinkstock

leg



shell

**D**

© SafakOguz / iStock / Thinkstock

antennae



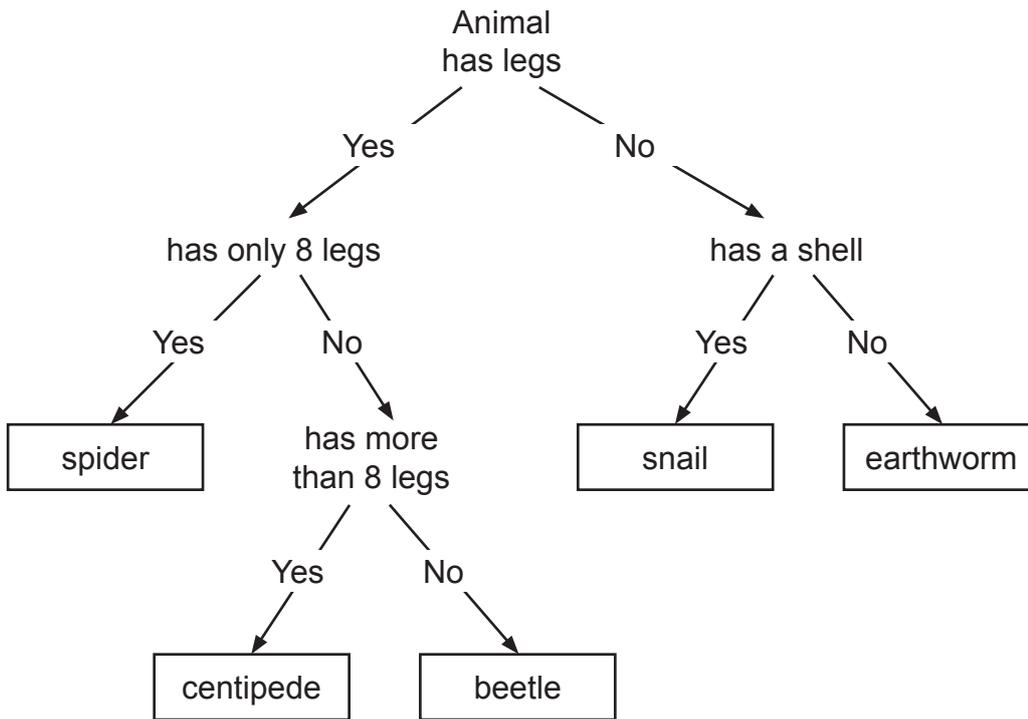
**E**

© anatchant / iStock / Thinkstock

leg

Examiner Only	
Marks	Remark

(a) Use the key below to identify the animals.



Write the names of the animals in the table below.

Letter	Name of animal
A	
B	
C	
D	
E	

[3]

(b) (i) Name the type of apparatus Adam used to collect these animals.

\_\_\_\_\_

[1]

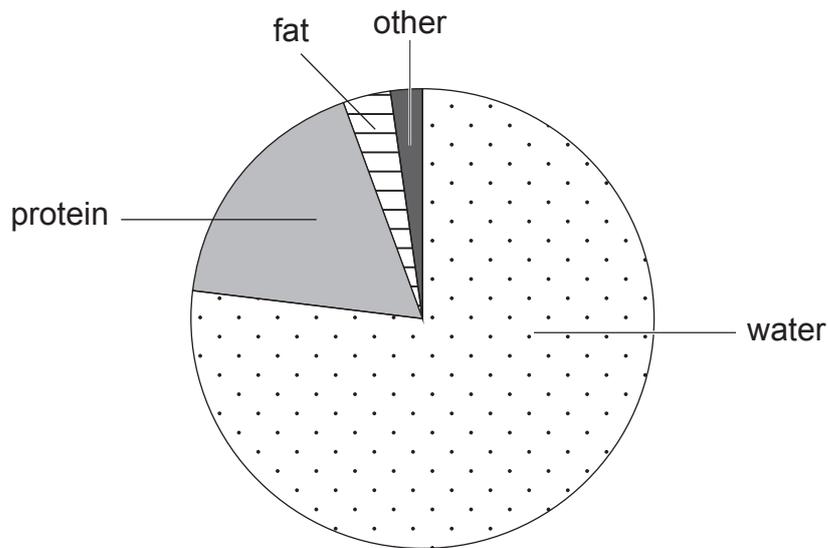
(ii) Name the type of apparatus Adam would use to sample **plants**.

\_\_\_\_\_

[1]

Examiner Only	
Marks	Remark

- 2 (a) The pie chart shows the percentages of different nutrients found in fresh fish.



Source: Principal Examiner

- (i) What nutrient has the highest percentage in fresh fish?

\_\_\_\_\_

[1]

- (ii) Suggest **one** other type of nutrient found in fresh fish, apart from protein, fat and water.

\_\_\_\_\_

[1]

Examiner Only	
Marks	Remark

- (b) (i) Explain why fish cooked in a microwave is a healthier food choice than fish fried in oil.

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[1]

An unhealthy diet can lead to high blood pressure and strokes.

- (ii) Name **two other** conditions caused by an unhealthy diet.

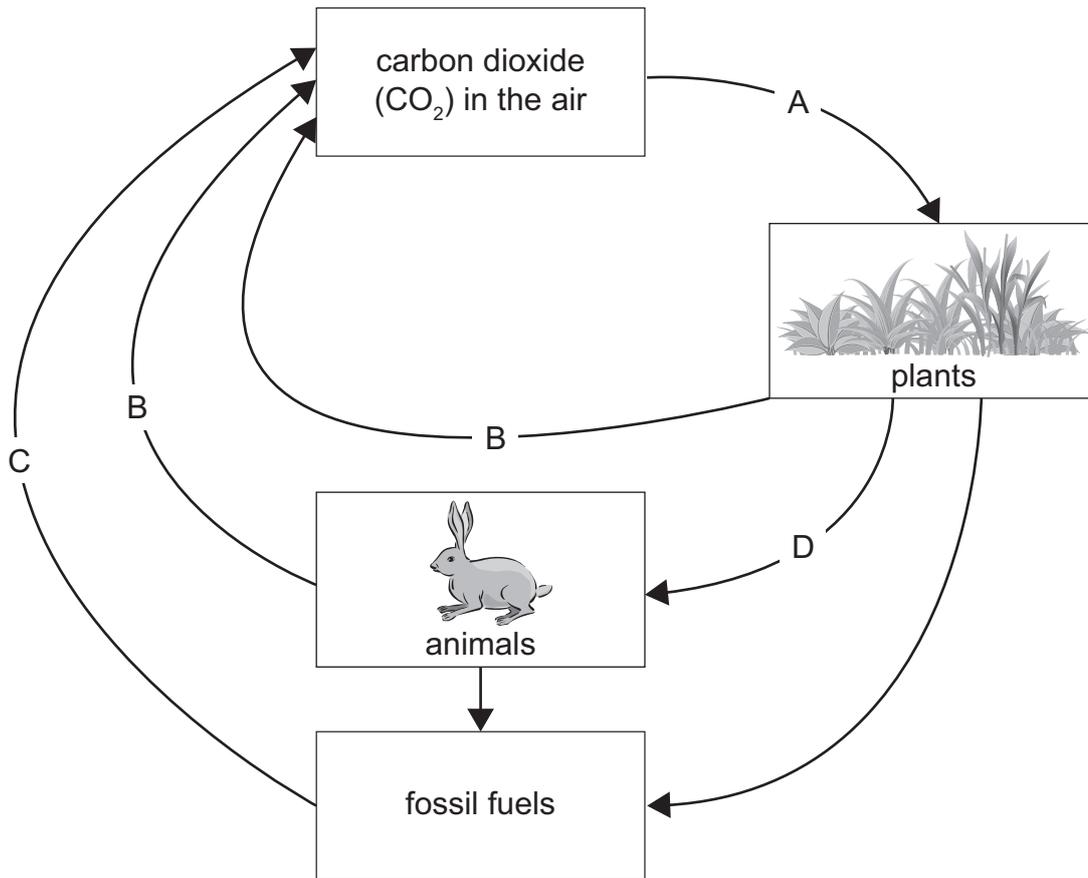
1. \_\_\_\_\_

2. \_\_\_\_\_

[2]

Examiner Only	
Marks	Remark

3 The diagram shows part of the carbon cycle.



(a) Name processes **A**, **B**, **C** and **D**.

- A \_\_\_\_\_
- B \_\_\_\_\_
- C \_\_\_\_\_
- D \_\_\_\_\_

[4]

Examiner Only	
Marks	Remark

- (b) (i) Complete the passage about the effects of carbon dioxide in the atmosphere.

Choose the correct words from the box.

insulates	increase	light	temperature
cools	warming	heat	decrease

Carbon dioxide is one of a number of gases that forms a layer around the Earth.

This layer of gases \_\_\_\_\_ the Earth.

If carbon dioxide levels \_\_\_\_\_,

more \_\_\_\_\_ energy is trapped.

This leads to global \_\_\_\_\_. [4]

- (ii) Give **one** effect on polar ice caps caused by recent changes in carbon dioxide levels in the atmosphere.

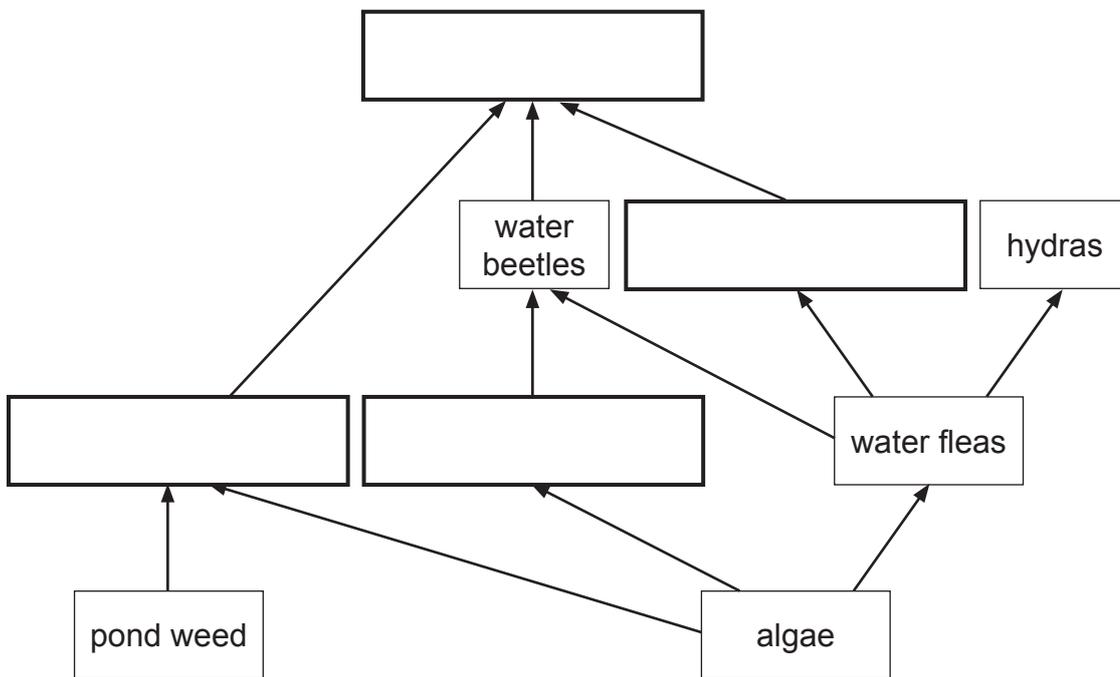
\_\_\_\_\_  
 \_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

4 The sentences below give information about feeding relationships in a pond.

Pond snails feed on pond weed and algae.  
 Hydras feed on water fleas.  
 Mayfly larvae and water fleas feed on algae.  
 Water beetles feed on mayfly larvae and water fleas.  
 Pond skaters feed on water fleas.  
 Roach feed on pond snails, water beetles and pond skaters.

(a) Complete the food web using the information given above.



Source: Principal Examiner

[4]

(b) What do the arrows in the food web represent?

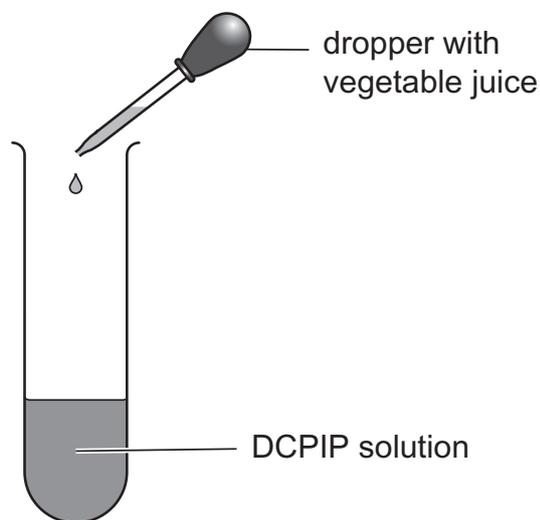
\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark



- 5 A student carried out an investigation to see how the vitamin C content of two vegetables changed depending on how they were stored. Vegetable juices were produced from equal masses of the two vegetables. The student tested each vegetable juice for vitamin C using DCPIP solution.

The diagram shows the apparatus she used.



© CCEA

The table below shows the methods of vegetable storage and the number of drops of the vegetable juice needed to produce a colour change in the DCPIP solution.

Method of storage	Number of drops of vegetable juice added	
	Broccoli	Peas
Not stored (fresh)	10	30
7 days at room temperature	15	47
7 days in a fridge	11	38
Frozen for 12 months	13	33

Source adapted from *ucce.ucdavis.edu*. Published 2007 society of Chemical Industry.  
J.Sci.Food Agriculture 0022-5142/2007

- (a) Give the colour change produced in the DCPIP solution.

Blue to \_\_\_\_\_

[1]

(b) Use the data in the table opposite to help answer the following questions.

- (i) Broccoli juice contained the most vitamin C when it was not stored (fresh), compared to the other methods of storage for broccoli. How can you tell this from the results?

\_\_\_\_\_ [1]

- (ii) Give the method of storage which results in the greatest loss of vitamin C in broccoli.

\_\_\_\_\_ [1]

- (c) Give the method of storage which results in the greatest loss of vitamin C in peas.

\_\_\_\_\_ [1]

- (d) Apart from the storage method, suggest **one** other factor that could affect the vitamin C content in these vegetables.

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

6 (a) Insulin is a chemical messenger that controls blood glucose levels.

(i) What type of substance is insulin?

\_\_\_\_\_ [1]

(ii) How does insulin travel in the body?

\_\_\_\_\_ [1]

The steps **A** to **E** below describe how insulin controls blood glucose levels.

**A** Insulin is produced in the pancreas.

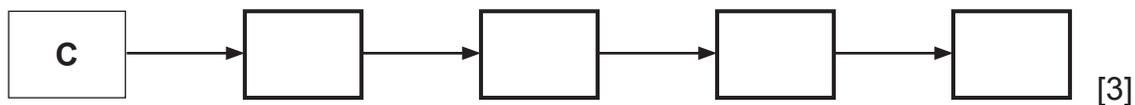
**B** Blood glucose levels decrease.

**C** Blood glucose levels increase.

**D** Insulin travels to the liver where it acts.

**E** Respiration increases and glucose is converted to glycogen.

(b) Use the letters to put the steps in the correct order in the boxes below.  
The first step is given.



Examiner Only	
Marks	Remark

- (c) The photograph below shows a girl injecting insulin to control her blood glucose levels.



© Voisin / Phanie / Science Photo Library

- (i) What condition does the girl have?

\_\_\_\_\_ [1]

- (ii) Give **two** possible long-term effects of this condition.

1. \_\_\_\_\_

2. \_\_\_\_\_ [2]

- (d) The central nervous system (CNS) is part of the nervous system in the body.

- (i) Name the parts of the central nervous system.

\_\_\_\_\_ and \_\_\_\_\_ [2]

- (ii) Complete the sentence below by writing the correct word in the space.

The central nervous system controls and coordinates the responses between \_\_\_\_\_ and effectors. [1]

- (iii) Name an effector in the body.

\_\_\_\_\_ [1]

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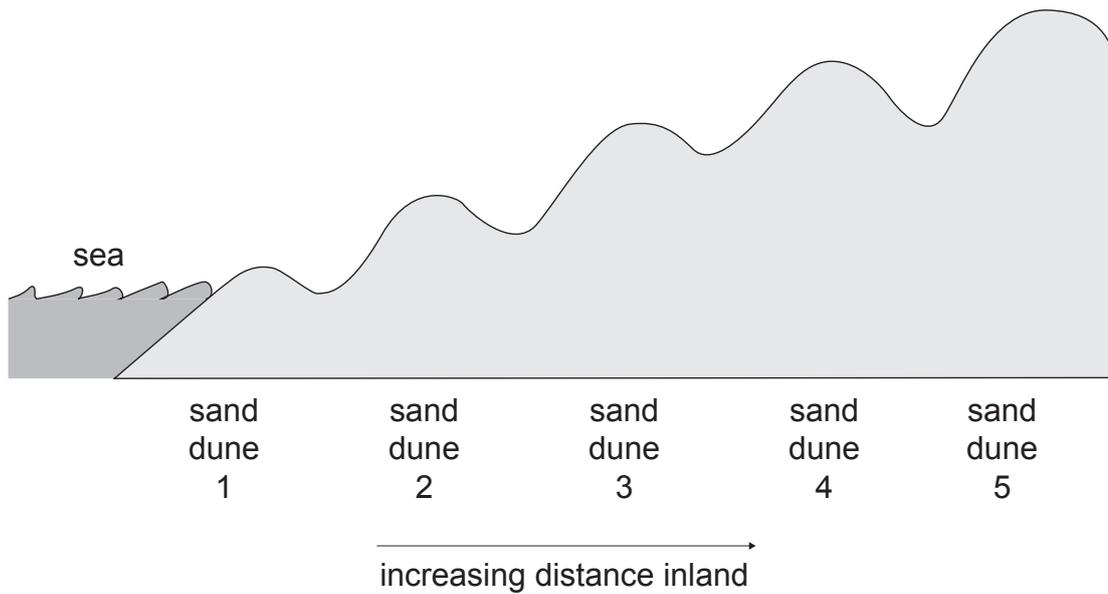
Marks Remark





8 A group of students investigated plant distribution in sand dunes.

The diagram shows the area where they carried out the investigation.



Source: Principal Examiner

The students estimated the number of species of plants growing in each sand dune.

They also collected a soil sample from each sand dune.

They measured the moisture content, mineral content and pH of the soil.

The table shows the students' results.

Sand dune	Number of species of plants	Soil moisture content/%	Soil mineral content/ arbitrary units	pH
1	2	7.7	8.2	7.9
2	7	8.4	9.8	7.6
3	12	16.9	20.4	7.4
4	13	29.8	36.1	7.0
5	17	33.5	46.1	6.5

Source: Principal Examiner

Examiner Only	
Marks	Remark

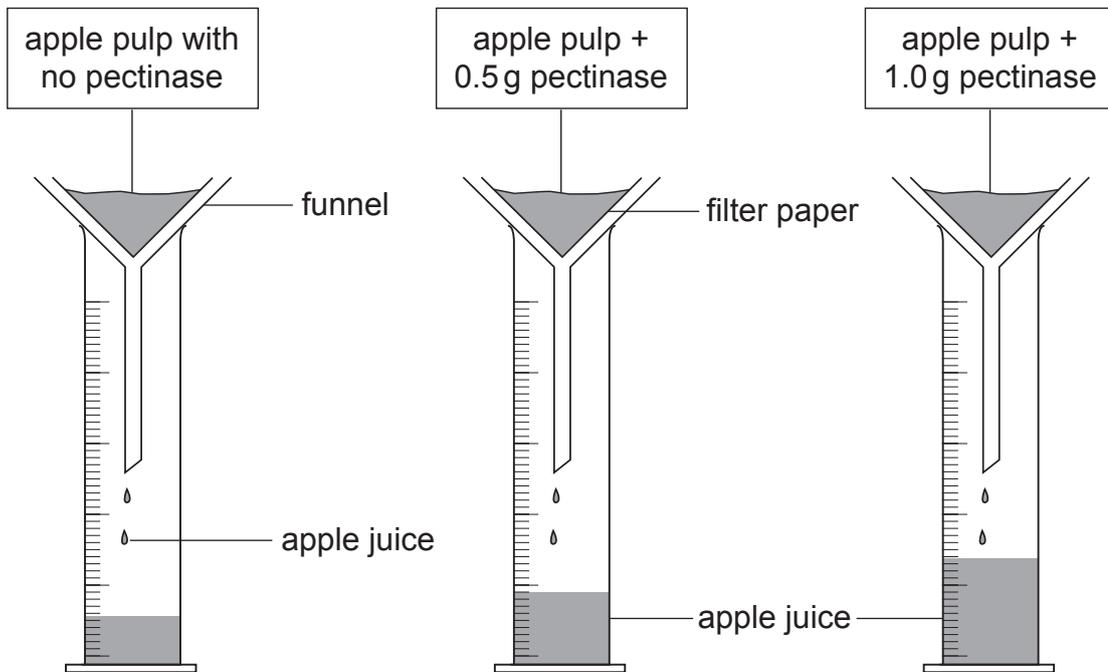


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- 9 Pectinase is an enzyme used in the production of fruit juice from fruit pulp. Pectinase acts on the substrate pectin in plant cell walls. This causes more fruit juice to be produced from fruit pulp.

Pupils investigated the effect of adding different masses of pectinase to the same amount of apple pulp.

The diagram shows the experimental set up.

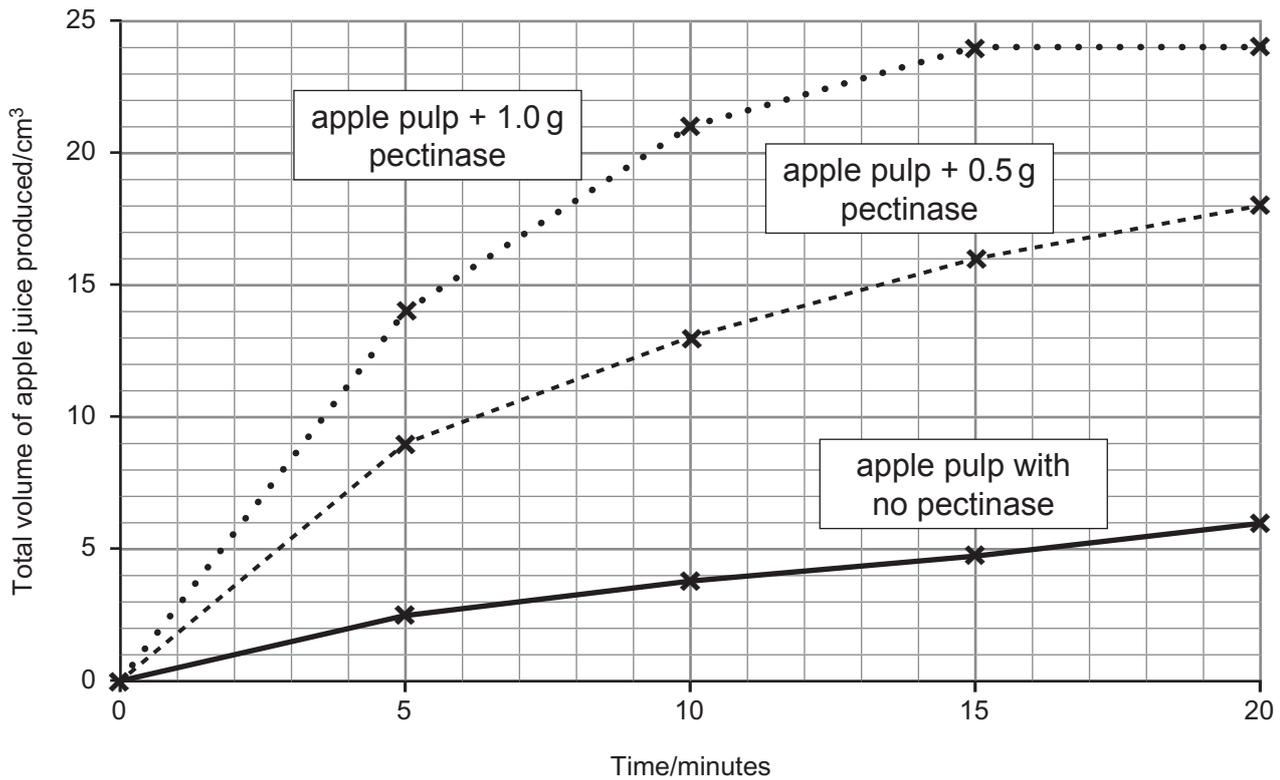


Source: Principal Examiner

Examiner Only	
Marks	Remark

- (a) The pupils recorded the total volume of apple juice produced in each measuring cylinder every five minutes for 20 minutes.

The graph below shows the results.



Source: Principal Examiner

Use the graph to answer the following questions.

- (i) The highest volume of apple juice was produced from the apple pulp when 1 g of pectinase was used.

Use your knowledge of enzymes to explain why.

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[2]

Examiner Only	
Marks	Remark

- (ii) Calculate the **percentage increase** in the total volume of apple juice produced over 20 minutes when 1 g of pectinase was used, compared to the total volume of apple juice produced when no pectinase was used.

**Show your working.**

\_\_\_\_\_ % [3]

- (b) When 1 g of pectinase was used, no more apple juice was produced after 15 minutes.  
Suggest why.

\_\_\_\_\_  
\_\_\_\_\_ [1]

- (c) The pupils repeated the experiment with the same amount of apple pulp and 1 g of a **different enzyme**.  
This enzyme does not act on the substrate pectin.

- (i) Use the results from the **graph** opposite to give the total volume of apple juice that would be produced over 20 minutes using this different enzyme.

\_\_\_\_\_ cm<sup>3</sup> [1]

- (ii) Use your knowledge of enzyme structure to explain why this different enzyme does not act on the substrate pectin.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

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Marks	Remark

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**THIS IS THE END OF THE QUESTION PAPER**

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