



MINISTRY OF EDUCATION, SINGAPORE
in collaboration with
CAMBRIDGE ASSESSMENT INTERNATIONAL EDUCATION
General Certificate of Education Ordinary Level

CANDIDATE
NAME

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CENTRE
NUMBER

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INDEX
NUMBER

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SCIENCE (CHEMISTRY, BIOLOGY)

5088/04

Paper 4 Biology

For examination from 2024

SPECIMEN PAPER

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your centre number, index number and name on all the work you hand in.

You may use an HB pencil for any diagrams, graphs or rough working.

Write in dark blue or black pen.

Do not use staples, paper clips, glue or correction fluid.

The use of an approved scientific calculator is expected, where appropriate.

You may lose marks if you do not show your working or if you do not use appropriate units.

DO **NOT** WRITE IN ANY BARCODES.

Section A

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Section B

Answer **one** question.

Write your answers in the spaces provided on the question paper.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of 17 printed pages and 1 blank page.



Singapore Examinations and Assessment Board



Cambridge Assessment
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Section A

Answer **all** the questions in the spaces provided.

- 1 A student investigates the effect of pH change on the activity of an enzyme, amylase, on starch.

She measures the time taken for the same quantity of starch to be completely digested at different pH values. Her results are shown in Fig. 1.1.

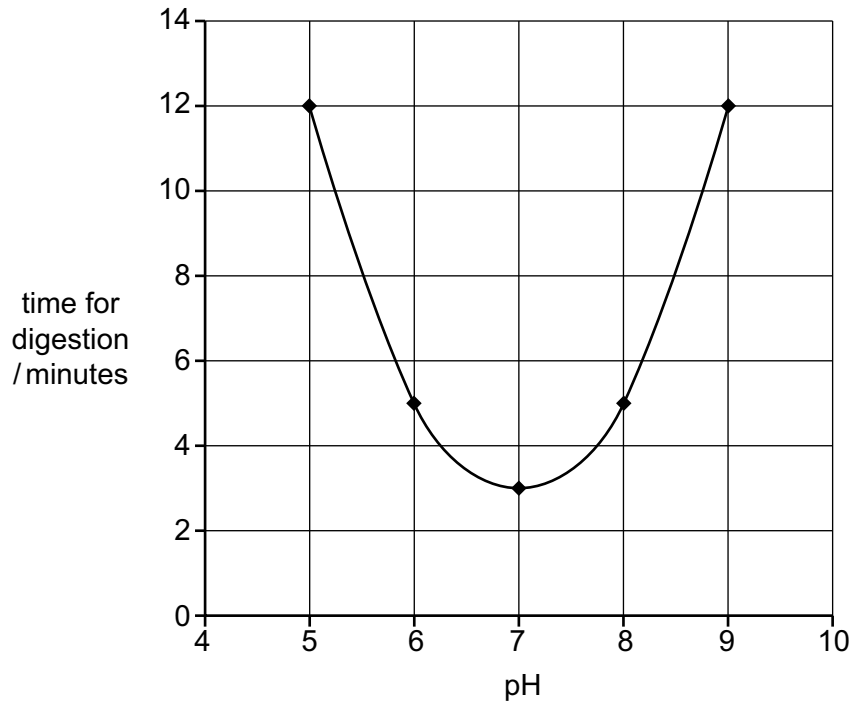


Fig. 1.1

- (a) Starch is a carbohydrate.

State the main role of carbohydrates in living organisms.

.....
 [1]

- (b) The student uses a test for starch to find out when it has been completely digested.

Describe a test she could use and the changes she would observe.

.....

 [3]

(c) Using information in Fig 1.1, describe the effect of changing pH on the activity of this enzyme.

.....

.....

.....

.....

..... [2]

(d) Amylase will act only on starch molecules.

The action of amylase on starch varies with pH.

Use the 'lock and key' hypothesis of enzyme action to explain these observations.

.....

.....

.....

.....

..... [3]

[Total: 9]

2 A student cuts five identical pieces of potato, each 5.0 cm long.

He places each piece in a different concentration of sucrose solution for one hour.

He then measures the length of each piece of potato.

His results are shown in Table 2.1.

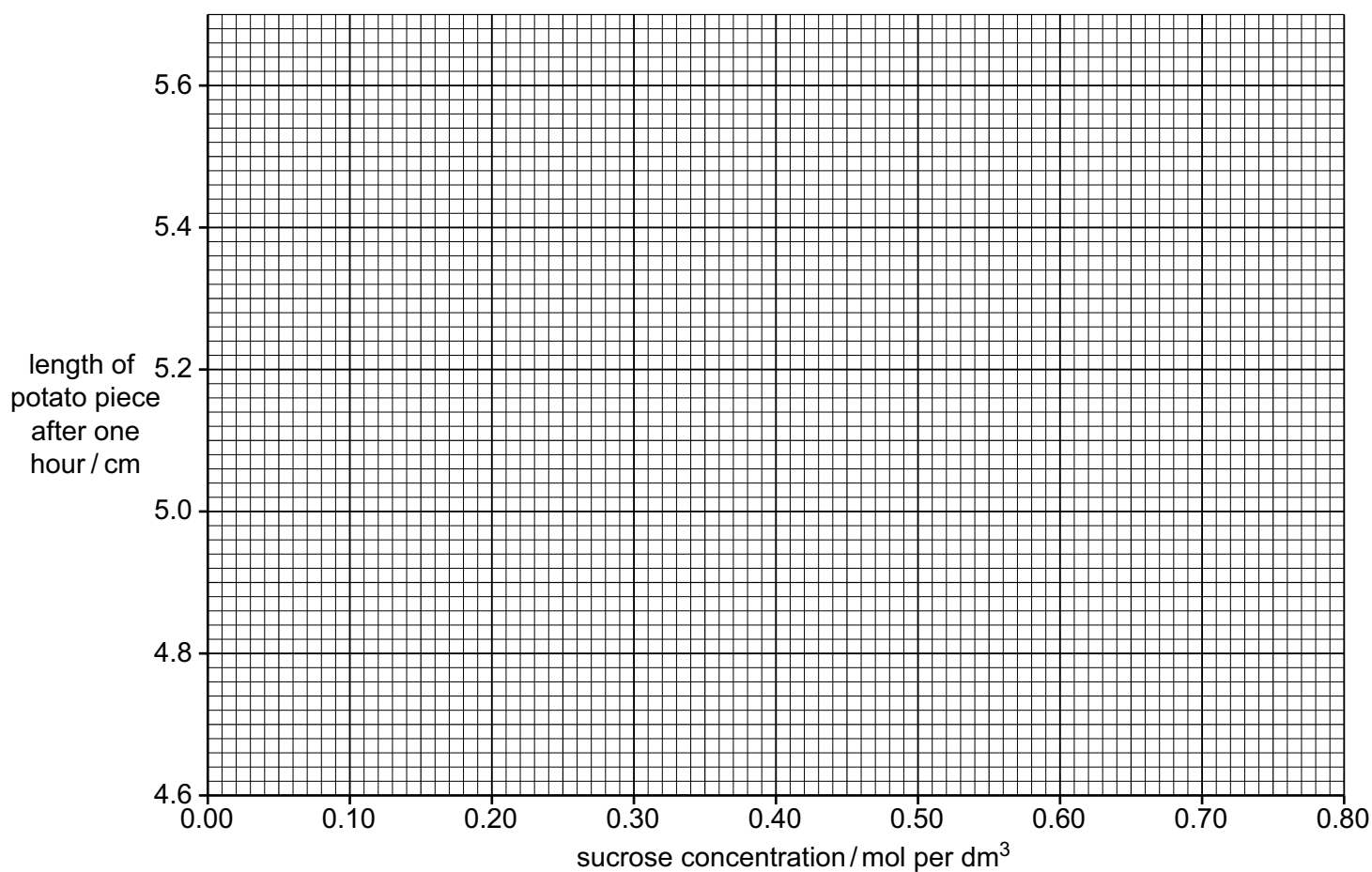
Table 2.1

sucrose concentration in mol/dm ³	length of potato piece after one hour in cm
0.00	5.6
0.20	5.4
0.40	5.1
0.60	4.9
0.80	4.6

(a) (i) Plot these results on the grid.

[2]

(ii) Use a ruler to draw the best fit line.



[1]

(b) State the name of the process that causes the potato pieces to change length.

..... [1]

(c) Explain why some of the potato pieces increase in length.

.....
..... [2]

(d) (i) Use your graph to find the concentration of sucrose that results in no change in the length of potato.

..... mol/dm³ [1]

(ii) Explain why this sucrose concentration does not result in a change of length.

.....
..... [2]

[Total: 9]

- 3 Fig. 3.1 shows the number of cases of pneumococcal disease in children in a country between 1998 and 2008.

A vaccine was introduced in the year 2000.

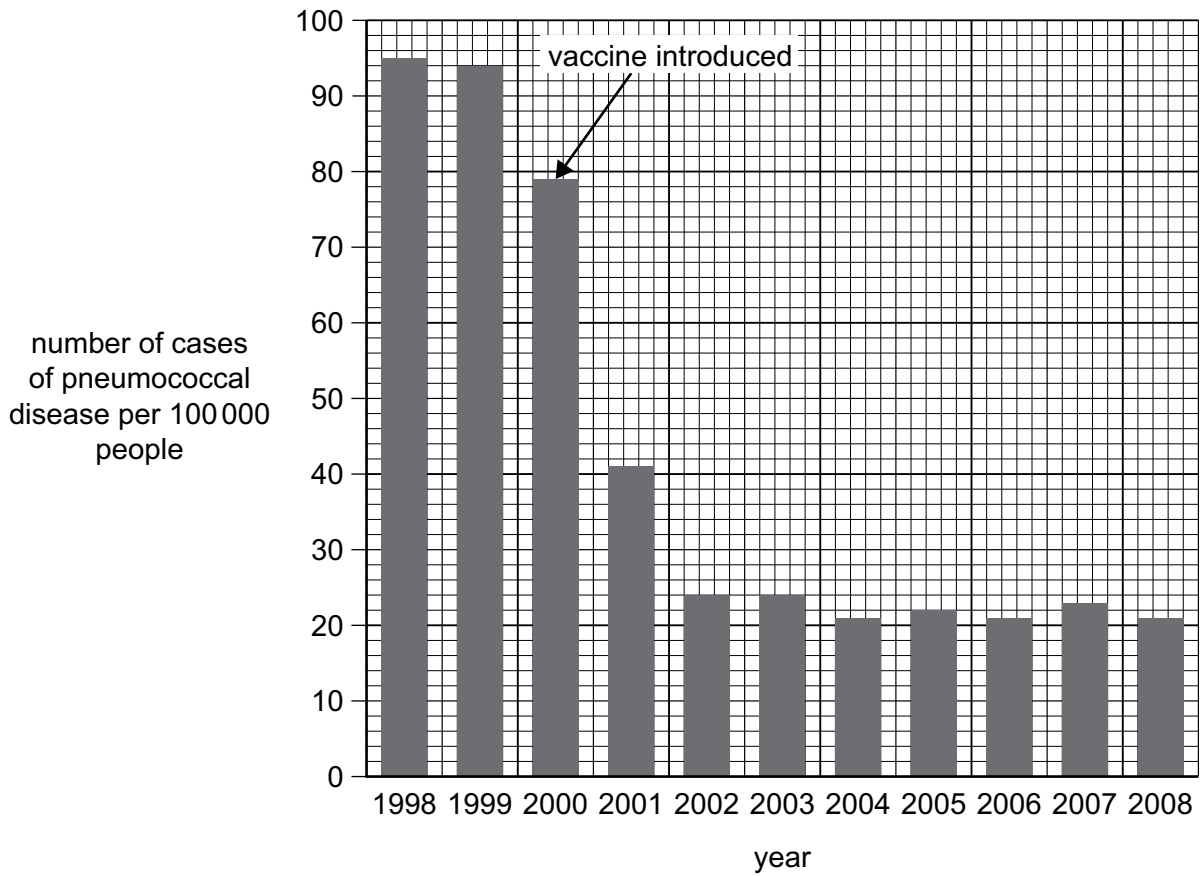


Fig. 3.1

- (a) (i) Calculate the percentage decrease in cases between 2000 and 2008.

.....% [2]

- (ii) Explain how the introduction of vaccines caused a percentage decrease in cases in (a)(i).

.....

 [3]

(b) State the type of organism that causes pneumococcal disease.

..... [1]

(c) Suggest why there are still cases of pneumococcal disease even after the introduction of the vaccine.

..... [1]

[Total: 7]

4 Polydactyly is a condition in which people have more than ten fingers or ten toes.

Fig. 4.1 shows the inheritance of polydactyly in three generations of a family.

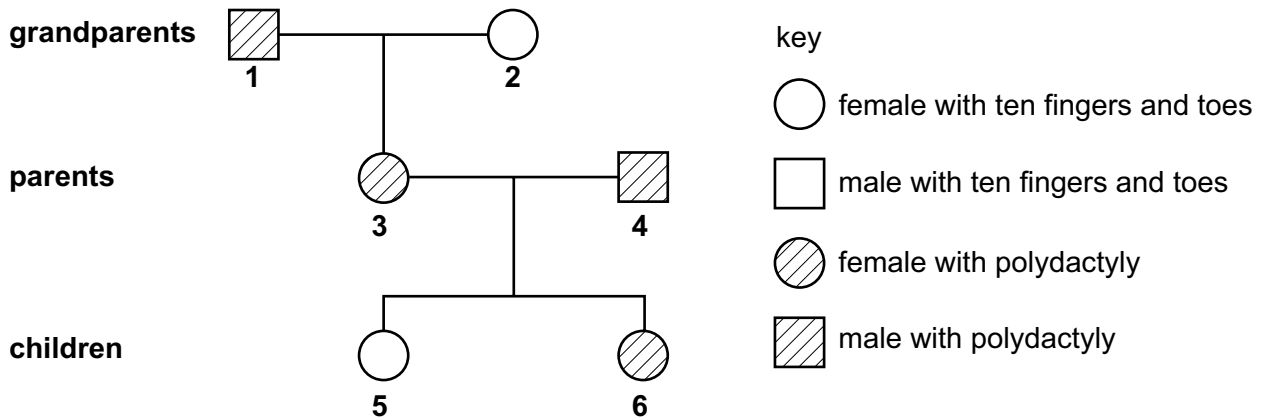


Fig 4.1

Polydactyly is controlled by a single gene that has both dominant and recessive alleles.

(a) Explain what is meant by:

(i) allele

.....
 [1]

(ii) recessive.

.....
 [1]

(b) The allele causing polydactyly is dominant.

Which evidence, from Fig. 4.1, shows that the allele causing polydactyly is dominant? Explain your answer.

.....

 [2]

(c) Using the symbols **F** and **f** for the dominant and recessive alleles:

(i) state the genotype of grandparent **2**

..... [1]

(ii) state the possible genotypes of child **6**.

..... [2]

(d) State which **two** members of the family must be heterozygous for polydactyly.

..... and [2]

(e) Scientists have stated that polydactyly first appeared because of a mutation.

Define the term mutation.

..... [1]

[Total: 10]

5 Fig. 5.1 shows variation in the pressure of blood as it passes through successive blood vessels.

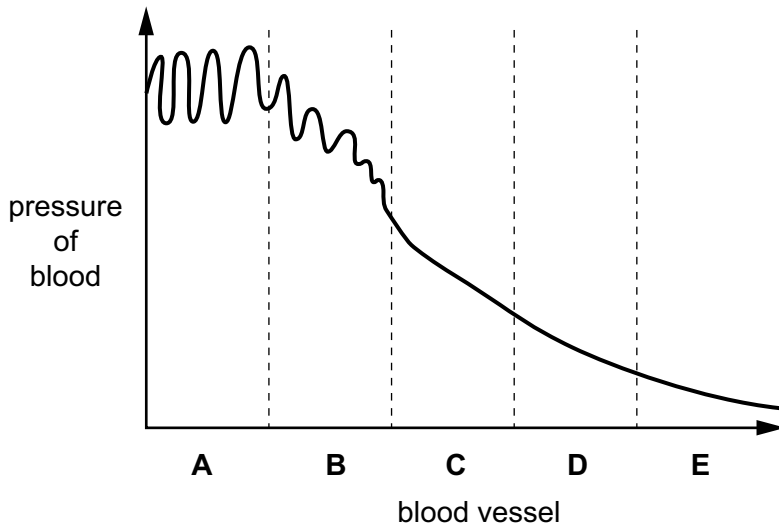


Fig. 5.1

(a) Write the type of each blood vessel next to the correct letter in the table.

Choose names from this list.

vein artery small vein small artery capillary

	type of blood vessel
A	
B	
C	
D	
E	

[3]

(b) Use ideas about blood pressure to help you explain the following facts.

(i) The walls of arteries are much thicker than those of veins.

.....
 [2]

(ii) Veins have valves but arteries do not.

.....
 [2]

(c) A disease involves the blockage of arteries leading to the heart muscles.

(i) Name this disease.

..... [1]

(ii) State **two** causes of this disease.

1

2 [2]

[Total: 10]

6 Fig. 6.1 shows part of the carbon cycle.

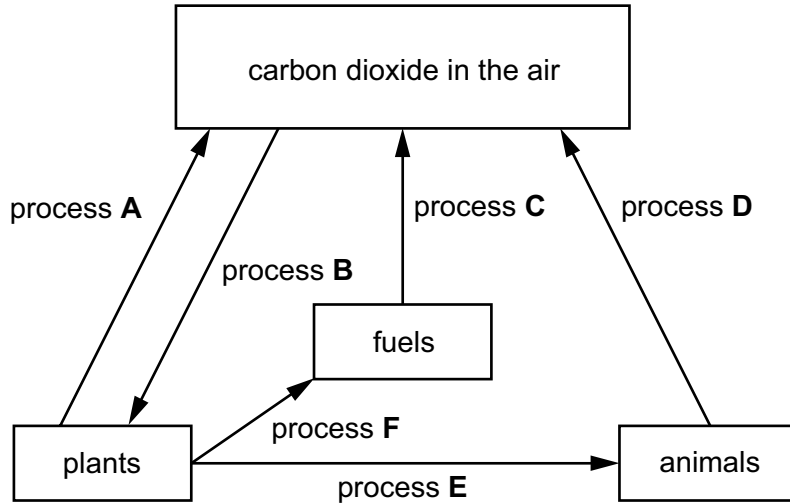


Fig. 6.1

(a) Name processes A, B, D and E. Explain how these processes maintained a constant percentage of carbon dioxide in the Earth's atmosphere for thousands of years.

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.....
..... [5]

Section B

Answer **one** question from this section.

7 Cactus plants live in hotter and drier parts of the world than buttercup plants.

Fig. 7.1 shows how the size of stomatal openings in these two plants varies during a 24-hour period.

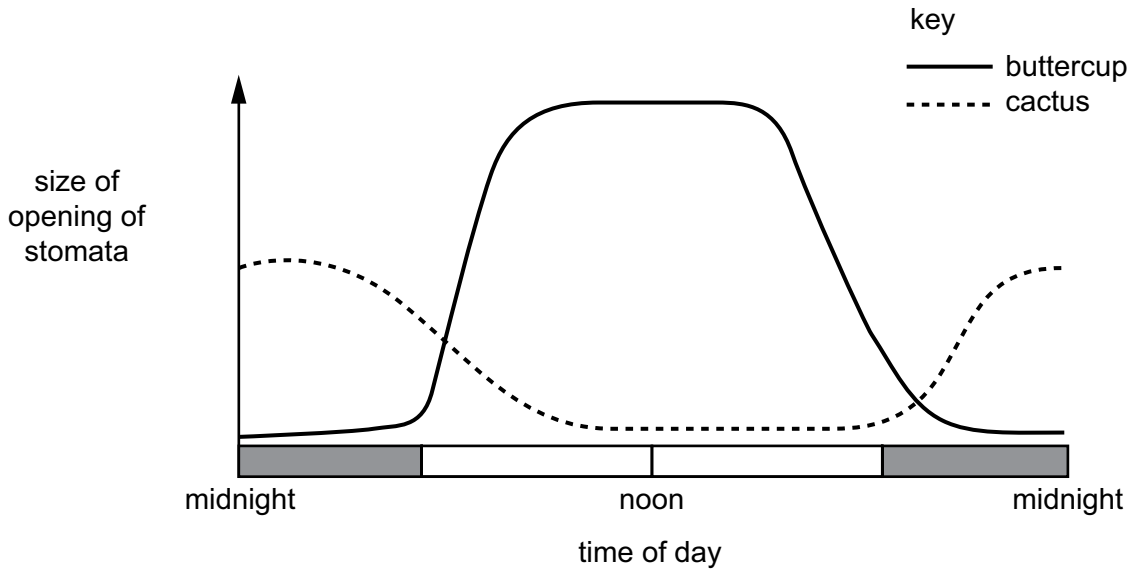


Fig. 7.1

(a) (i) Use information from the graph to describe differences in water loss by transpiration between these two plants.

.....

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.....

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..... [3]

(ii) Explain these differences in relation to the survival of the plants in their different habitats.

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..... [3]

(b) Both plants absorb water from the soil through their roots. Explain how the structure of root hair cells helps them to perform their functions in the uptake of water and minerals.

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..... [4]

[Total: 10]

8 Fig. 8.1 shows how blood glucose concentration and blood insulin levels vary after glucose is ingested by a healthy person.

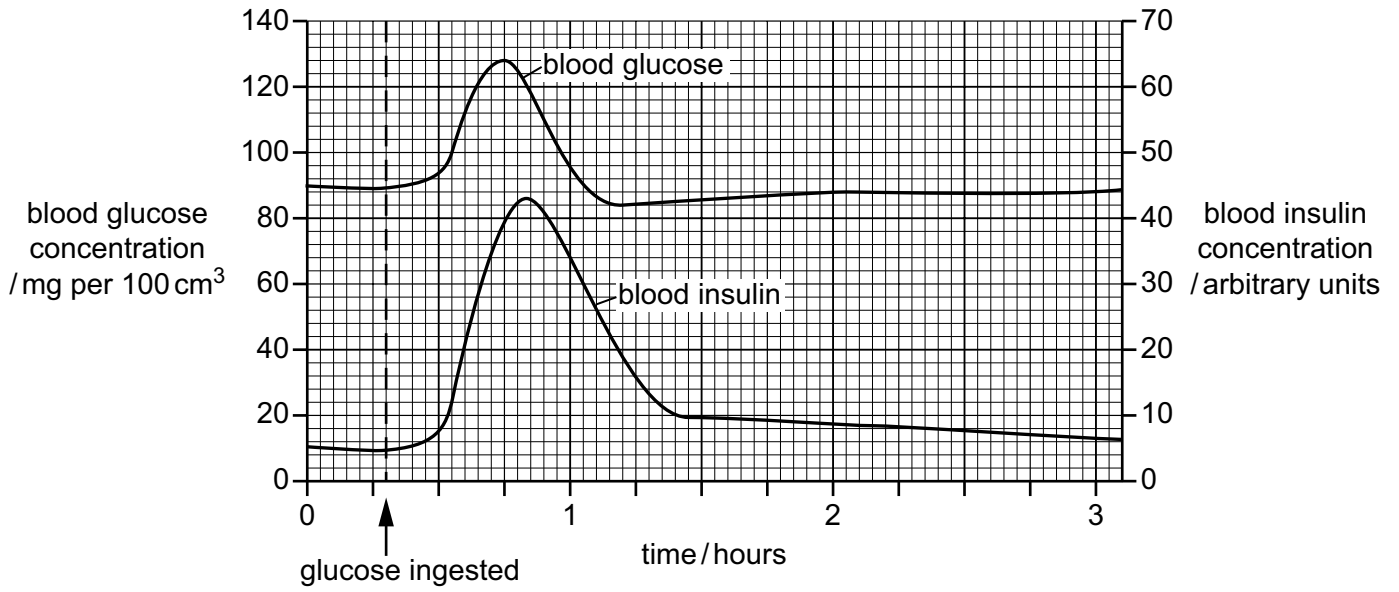


Fig. 8.1

(a) (i) Use information from the graph to describe the changes after glucose is ingested.

.....

.....

.....

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..... [4]

(ii) Explain your answer in part (i).

.....

.....

..... [2]

(b) Describe and explain how changes in blood glucose concentration would differ for a person with type 2 diabetes after ingestion of glucose.

.....

.....

.....

.....

..... [4]

[Total: 10]

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