AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.2.2.1

The human digestive system

Past-paper questions

Tier	**Foundation**
Question groups	**7**
Available paper years	**2019–2024**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.2.2.1 The human digestive system

Question 01

June 2019 | 8464/B/1F | Original Q7

0 7 This question is about digestion.

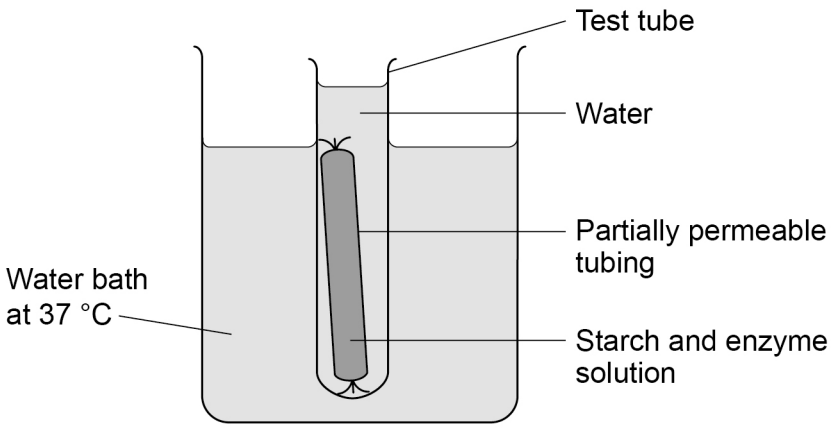
0 7 . 1 Name the enzyme that digests starch in the human digestive system.

[1 mark]

A student set up a model to represent the digestion and absorption of food molecules in the digestive system.

Figure 11 shows the student's model.

Figure 11



This is the method used.

1. Fill a test tube with water at 37 °C
2. Test the water for starch and for sugar.
3. Mix together starch and enzyme solution and immediately test it for starch and for sugar.
4. Fill some partially permeable tubing with the starch and enzyme mixture.
5. Seal the tubing and place it in the test tube of water.
6. Place the test tube in a water bath at 37 °C
7. After 30 minutes, test the mixture inside the partially permeable tubing and test the water in the test tube for starch and for sugar.

0 7 . 2 Suggest which parts of the body the partially permeable tubing and the water in the test tube represent.

[2 marks]

Partially permeable tubing _____

Water in the test tube _____

4.2.2.1 The human digestive system

Question 01 · continued

Table 3 shows the results.

Table 3

Test	Description of liquid	Result of starch test	Result of sugar test
1	Mixture inside tubing at start	✓	✗
2	Water in the test tube at start	✗	✗
3	Mixture inside tubing after 30 minutes	✓	✓
4	Water in the test tube after 30 minutes	✗	✓

Key
✓ = Present
✗ = Not present

0 7 . 3 Name the reagents used to test for starch and for sugar.

[2 marks]

Starch _____

Sugar _____

0 7 . 4 Why was there no sugar present in test **1**?

[1 mark]

_____

_____

0 7 . 5 Explain the results for test **3**.

[2 marks]

_____

_____

_____

_____

_____

4.2.2.1 The human digestive system

Question 01 · continued

0 7 . 6 Explain the results for test **4**.

[2 marks]

10

4.2.2.1 The human digestive system

Question 02

November 2020 | 8464/B/1F | Original Q6

0 6 Starch is digested to form sugar molecules in the digestive system.

0 6 . 1 What is the name of the enzyme that digests starch?

[1 mark]

0 6 . 2 Where are most food molecules absorbed?

[1 mark]

Tick (✓) **one** box.

- Large intestine ☐
- Liver ☐
- Small intestine ☐
- Stomach ☐

Question 6 continues on the next page

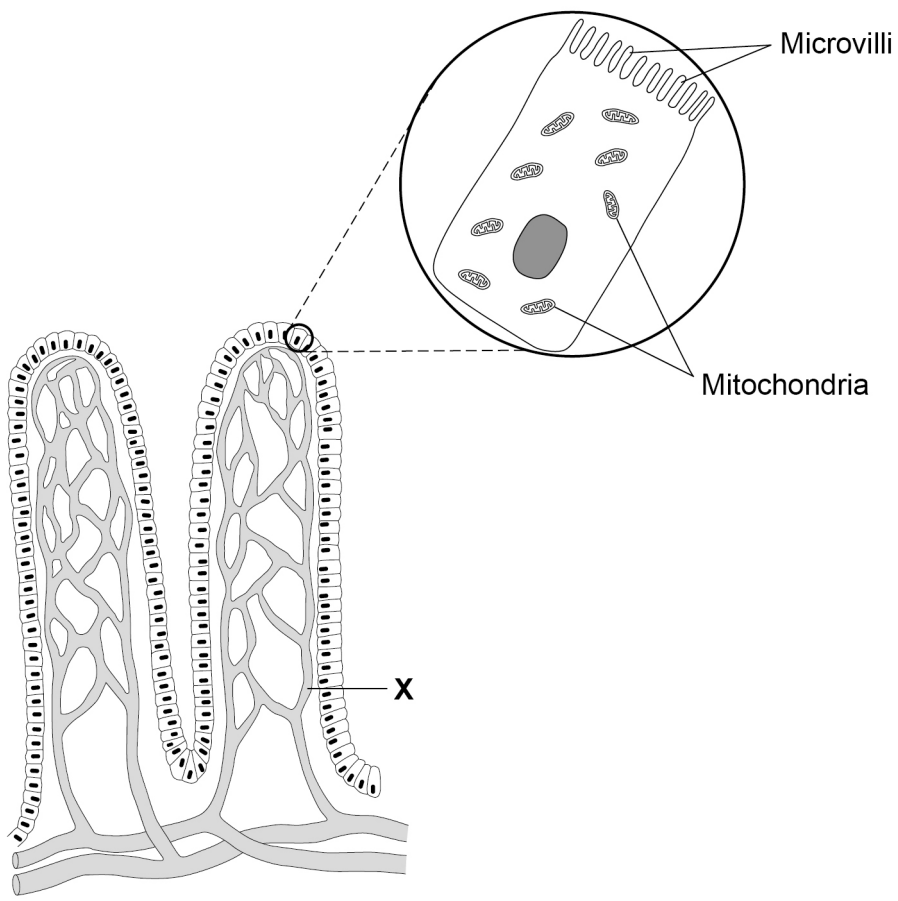
4.2.2.1 The human digestive system

Question 02 · continued

Figure 6 shows two villi.

Figure 6 also shows one cell on the surface of a villus as seen using an electron microscope.

Figure 6



0 6 . 3 Give **one** advantage of using an electron microscope compared with using a light microscope.

[1 mark]

4.2.2.1 The human digestive system

Question 02 · continued

0 6 . 4 What type of blood vessel is labelled **X**?

[1 mark]

Tick (✓) **one** box.

Artery ☐

Capillary ☐

Vein ☐

0 6 . 5 The real length of one villus is 0.8 mm

Calculate the image length if the villus is viewed at a magnification of ×20

Use the equation:

$$\text{magnification} = \frac{\text{size of image}}{\text{size of real object}}$$

[3 marks]

Image length = _____ mm

Question 6 continues on the next page

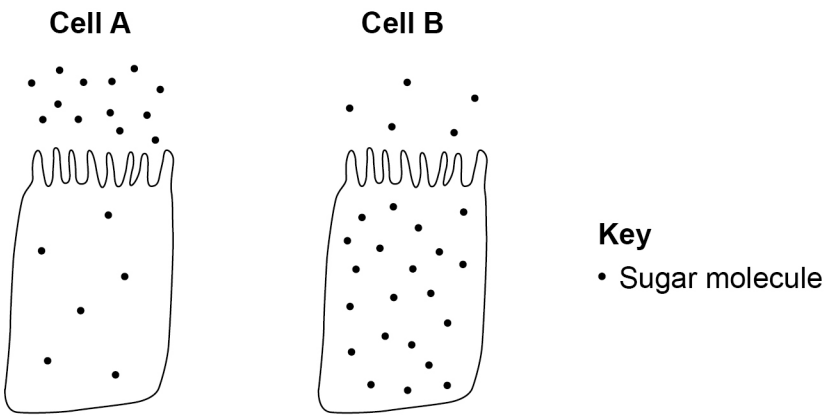
4.2.2.1 The human digestive system

Question 02 · continued

Figure 7 shows two cells from the surface of a villus.

There are sugar molecules inside and next to each cell.

Figure 7



0 6 . 6 Name the process by which sugar moves into cell **A**.

[1 mark]

0 6 . 7 Name the process by which sugar moves into cell **B**.

[1 mark]

0 6 . 8 Give **one** use of sugar in the body.

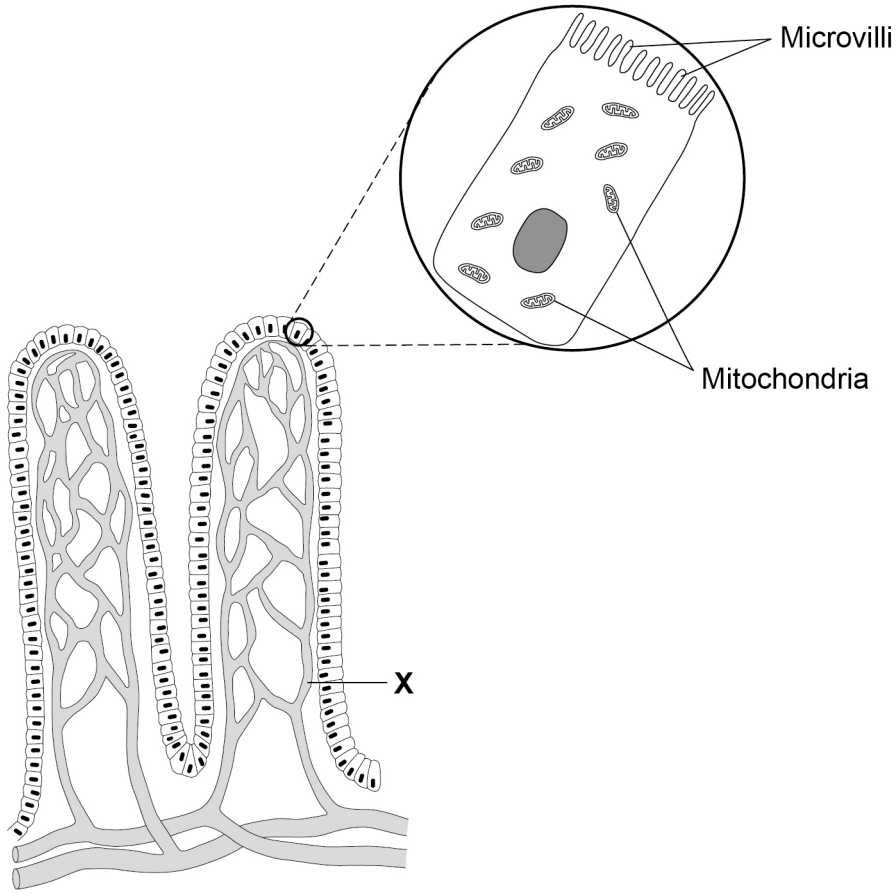
[1 mark]

4.2.2.1 The human digestive system

Question 02 · continued

0 6 . 9 **Figure 6** is repeated below.

Figure 6



Explain how villi are adapted for efficient absorption of sugar molecules.

[4 marks]

14

4.2.2.1 The human digestive system

Question 03

November 2021 | 8464/B/1F | Original Q6

0 6 Describe how to test a sample of food for protein, starch and sugar.

Give the colours that would be seen if the food sample contained protein, starch and sugar.

[6 marks]

6

4.2.2.1 The human digestive system

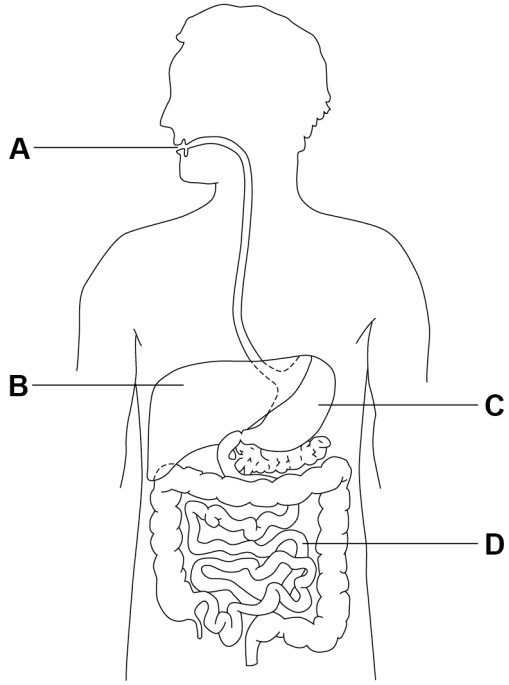
Question 04

June 2022 | 8464/B/1F | Original Q1

0 1 Foods are digested before they are absorbed into the blood.

Figure 1 shows organs in the human digestive system.

Figure 1



0 1 . 1 Which organ is the stomach?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 1 . 2 What type of enzyme is produced in the stomach?

[1 mark]

Tick (✓) **one** box.

Carbohydrase ☐

Lipase ☐

Protease ☐

4.2.2.1 The human digestive system

Question 04 · continued

0 1 . 3 Which term describes the pH in the stomach?

Give **one** reason why the stomach is this pH.

[2 marks]

Tick (✓) **one** box.

Acidic ☐

Alkaline ☐

Neutral ☐

Reason _____

_____

0 1 . 4 Which organ produces bile?

[1 mark]

Tick (✓) **one** box.

Large intestine ☐

Liver ☐

Mouth ☐

Pancreas ☐

Question 1 continues on the next page

4.2.2.1 The human digestive system

Question 04 · continued

0 1 . 5 How does bile help in the digestion of foods?

[1 mark]

Tick (✓) **one** box.

It increases the surface area of fats. ☐

It is an enzyme that digests protein. ☐

It makes the pH in the small intestine acidic. ☐

A student tested different foods for the presence of protein, starch and sugar.

0 1 . 6 Draw **one** line from each food molecule to the reagent used to test for the food molecule.

[2 marks]

Food molecule	Reagent
Protein	Benedict's solution
Starch	Biuret reagent
Sugar	Iodine solution

4.2.2.1 The human digestive system

Question 04 · continued

0 1 . 7 Give **one** safety precaution a student should take when using Benedict's solution.

[1 mark]

0 1 . 8 **Table 1** shows the results for one food sample.

Table 1

Test	**Benedict's test**	**Biuret test**	**Iodine test**
Colour after test	Red	Blue	Black

Which of the tests show positive results?

[1 mark]

Tick (✓) **one** box.

All three tests ☐

Benedict's and Biuret tests only ☐

Benedict's and iodine tests only ☐

Biuret and iodine tests only ☐

0 1 . 9 Starch molecules are **not** absorbed into the blood from the digestive system.

Give **one** reason why.

[1 mark]

11

4.2.2.1 The human digestive system

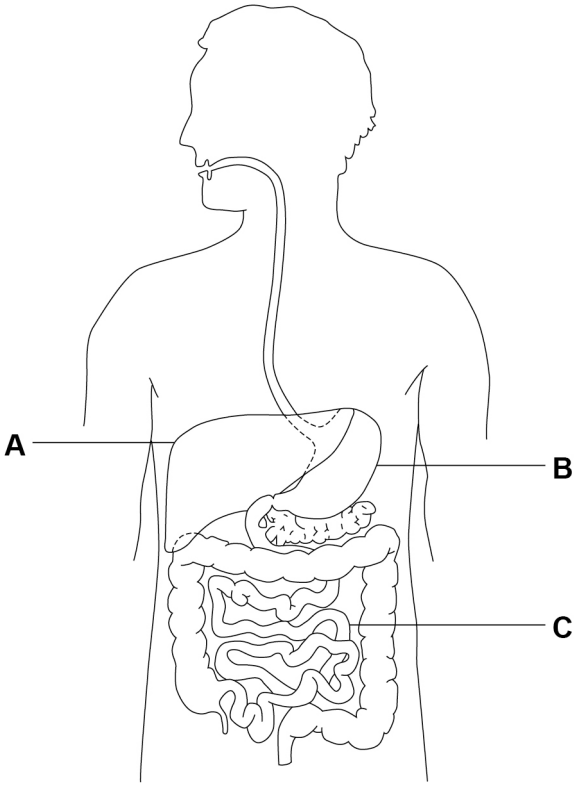
Question 05

June 2023 | 8464/B/1F | Original Q2

0 2 Enzymes break down food in the digestive system.

Figure 2 shows the human digestive system.

Figure 2



The enzyme amylase digests starch.

0 2 . 1 Which part of the digestive system produces amylase?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐

4.2.2.1 The human digestive system

Question 05 · continued

0 2 . 2 What molecules are produced when starch is digested?

[1 mark]

Tick (✓) **one** box.

Amino acids ☐

Fatty acids ☐

Sugars ☐

0 2 . 3 Where is digested food absorbed into the blood?

[1 mark]

Tick (✓) **one** box.

Liver ☐

Pancreas ☐

Small intestine ☐

Question 2 continues on page 9

4.2.2.1 The human digestive system

Question 05 · continued

A student investigated the effect of pH on the digestion of starch by amylase.

This is the method used.

1. Put 1 drop of iodine solution into each well of a spotting tile.
2. Prepare amylase solution at pH 5
3. Mix the amylase solution with starch solution in a test tube.
4. Every 30 seconds remove a drop of the amylase–starch mixture.
   Add each drop to iodine solution in a different well of the spotting tile.
5. Record the colour of the iodine solution after the amylase–starch mixture has been added.
6. Repeat steps 2 to 5 using amylase solutions at different pH values.

0 2 . 4 What is the independent variable in this investigation?

[1 mark]

Tick (✓) **one** box.

- pH of the amylase solution ☐
- Time when the samples were taken ☐
- Volume of iodine solution ☐

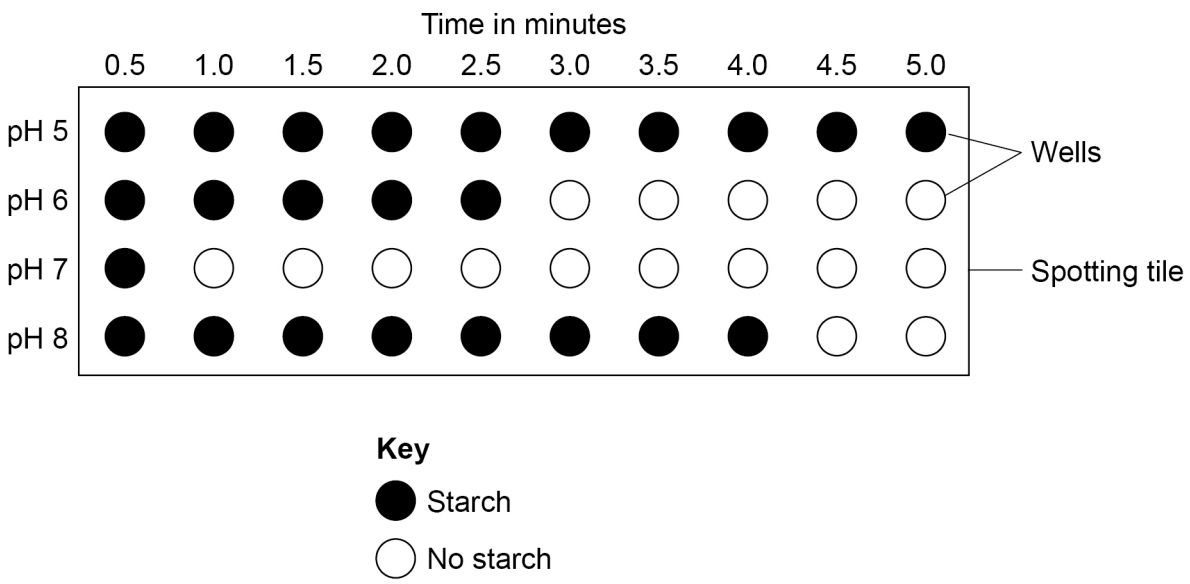
Question 2 continues on the next page

4.2.2.1 The human digestive system

Question 05 · continued

Figure 3 shows the results on the spotting tile.

Figure 3



0 2 . 5 What colours do the symbols in the key represent?

Choose answers from the box.

[2 marks]

black	**green**	**lilac**	**orange**	**white**

● _____

○ _____

0 2 . 6 Look at the results for pH 6 in **Figure 3**.

How many minutes did it take for all the starch to be digested at pH 6?

[1 mark]

_____ minutes

0 2 . 7 What was the optimum pH for the amylase to work?

Use **Figure 3**.

[1 mark]

Tick (✓) **one** box.

pH 5 ☐ pH 6 ☐ pH 7 ☐ pH 8 ☐

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Turn over for the next question

4.2.2.1 The human digestive system

Question 06

June 2023 | 8464/B/2F | Original Q7

0 7 It is estimated that 99.9% of all species that have ever existed are now extinct.

0 7 . 1 Why is the percentage of species that are extinct only an estimate?

[1 mark]

Tick (✓) **one** box.

All individuals of one species have the same genes. ☐

Extinction is always caused by humans. ☐

Humans have not found evidence of every species. ☐

0 7 . 2 What evidence is used to study species that have become extinct?

[1 mark]

4.2.2.1 The human digestive system

Question 06 · continued

0 7 . 3 A bacterium called *Clostridioides difficile* (*C. difficile*) can infect the human digestive system.

C. difficile can multiply and produce toxins. The toxins cause diarrhoea.

Doctors are concerned that new strains of *C. difficile* may evolve. Antibiotics may **not** be able to kill these new strains.

Explain how the evolution of antibiotic resistant *C. difficile* can be slowed down.

[6 marks]

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4.2.2.1 The human digestive system

Question 07

June 2024 | 8464/B/1F | Original Q6

0 6 Drinks contain different substances.

A drinks company claims that a drink contains sugar, protein and fat.

0 6 . 1 Glucose and fructose are different sugars.

Fructose has a much sweeter taste than glucose.

Suggest **two** reasons why the drinks company uses fructose in the drink rather than using glucose.

Do **not** refer to sweetness in your answer.

[2 marks]

1 _____

_____

2 _____

_____

0 6 . 2 Describe how a student could test the drink for **sugar**.

Give the colour of a positive result.

[3 marks]

Test _____

_____

_____

_____

Colour of positive result _____

4.2.2.1 The human digestive system

Question 07 · continued

0 6 . 3 Describe how a student could test the drink for **protein**.

Give the colour of a positive result.

[2 marks]

Test _____

_____

_____

Colour of positive result _____

Question 6 continues on the next page

4.2.2.1 The human digestive system

Question 07 · continued

0 6 . 4 The human digestive system breaks down protein and fat in the drink.

Describe how **protein** and **fat** are digested.

You should include:

- the enzymes involved
- where the enzymes are produced.

[6 marks]

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