AQA GCSE Biology | 8461

SPECIFICATION POINT 4.1.3.3

Active transport

Past-paper questions

Tier	**Higher**
Question groups	**9**
Available paper years	**2008–2025**

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:** _____

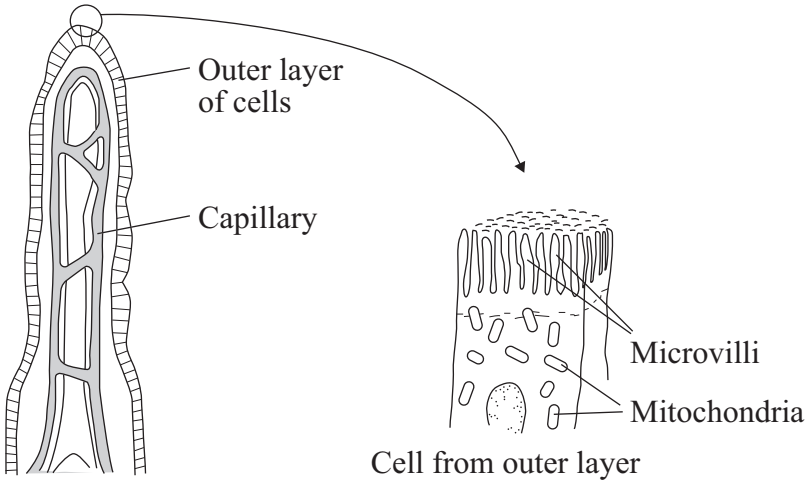
Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.1.3.3 Active transport

Question 01

January 2008 | BLY3H | Original Q6 | Legacy

6 The small intestine is lined with millions of villi.
The diagram shows the structure of a villus.



In the small intestine, some of the products of digestion are absorbed into the blood by *active transport*.

(a) Explain what is meant by *active transport*.

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(2 marks)

(b) How do microvilli and mitochondria help in the active transport of the products of digestion from the small intestine into the blood?

Microvilli .....

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Mitochondria .....

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(2 marks)

4

4.1.3.3 Active transport

Question 02

June 2008 | BLY3H | Original Q5 | Legacy

5 The table shows the concentrations of some substances in one person's blood plasma, kidney filtrate and urine.

Substance	Concentration in grams per dm^3		
	Plasma	Filtrate	Urine
Water	900.0	900.0	950.0
Protein	78.0	0.0	0.0
Glucose	0.8	0.8	0.0
Amino acids	0.4	0.4	0.0
Urea	0.3	0.3	20.0
Sodium ions	2.8	2.8	3.5

5 (a) (i) Protein is **not** present in the filtrate.

Explain why.

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(1 mark)

5 (a) (ii) Glucose is filtered out of the blood by the kidney and is then completely reabsorbed back into the blood.

What is the evidence for this in the table?

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(2 marks)

4.1.3.3 Active transport

Question 02 · continued

for mark

5 (a) (iii) Glucose is reabsorbed into the blood by active transport.

Give **two** ways in which active transport differs from diffusion.

1 .....

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2 .....

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(2 marks)

5 (b) The concentration of urea is much higher in the urine than in the filtrate.

Explain what causes this.

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(1 mark)

6

4.1.3.3 Active transport

Question 03

January 2009 | BLY3H | Original Q5 | Legacy

5 Some scientists investigated the rates of absorption of different sugars by the small intestine.

In one experiment they used a piece of normal intestine.
In a second experiment they used a piece of intestine poisoned by cyanide. Cyanide is poisonous because it prevents respiration.

The results are shown in the table.

	Relative rates of absorption	
Sugar	**Normal intestine**	**Intestine poisoned by cyanide**
Glucose	1.00	0.33
Galactose	1.10	0.53
Xylose	0.30	0.31
Arabinose	0.29	0.29

5 (a) (i) Name **two** sugars from the table which can be absorbed by active transport.

1 .....

2 .....

(1 mark)

5 (a) (ii) Use evidence from the table to explain why you chose these sugars.

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(3 marks)

4.1.3.3 Active transport

Question 03 · continued

for mark

5 (b) All of the sugars named in the table can be absorbed by diffusion.

Explain how information from the table provides evidence for this.

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(2 marks)

6

Turn over for the next question

4.1.3.3 Active transport

Question 04

June 2010 | BLY3H | Original Q6 | Legacy

6 Diffusion and active transport take place in healthy kidneys.

6 (a) Explain what is meant by:

6 (a) (i) diffusion.....

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(2 marks)

6 (a) (ii) active transport .....

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(2 marks)

6 (b) Describe, as fully as you can, how urine is produced by the kidneys.

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(5 marks)

9

4.1.3.3 Active transport

Question 05

5 Read the following information about how the small intestine absorbs sugars.

- The blood absorbs glucose and some other sugars, like xylose, from the small intestine.
- Glucose molecules are the same size as xylose molecules, but glucose is absorbed more quickly than xylose.
- Experiments with pieces of intestine show that the uptake of oxygen by the intestine is 50% higher in the presence of glucose than in the absence of glucose. Xylose does not have this effect on the uptake of oxygen.
- The cells lining the small intestine have many mitochondria.

Explain how this information provides evidence that glucose is absorbed by the small intestine using *active transport*.

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(4 marks)

4

4.1.3.3 Active transport

Question 06

June 2013 | BL3HP | Original Q4 | Legacy

4 Plants exchange substances with the environment.

4 (a) Plant roots absorb water mainly by osmosis.
Plant roots absorb ions mainly by active transport.

Explain why roots need to use the two different methods to absorb water and ions.

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(4 marks)

4 (b) What is meant by the *transpiration stream*?

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(3 marks)

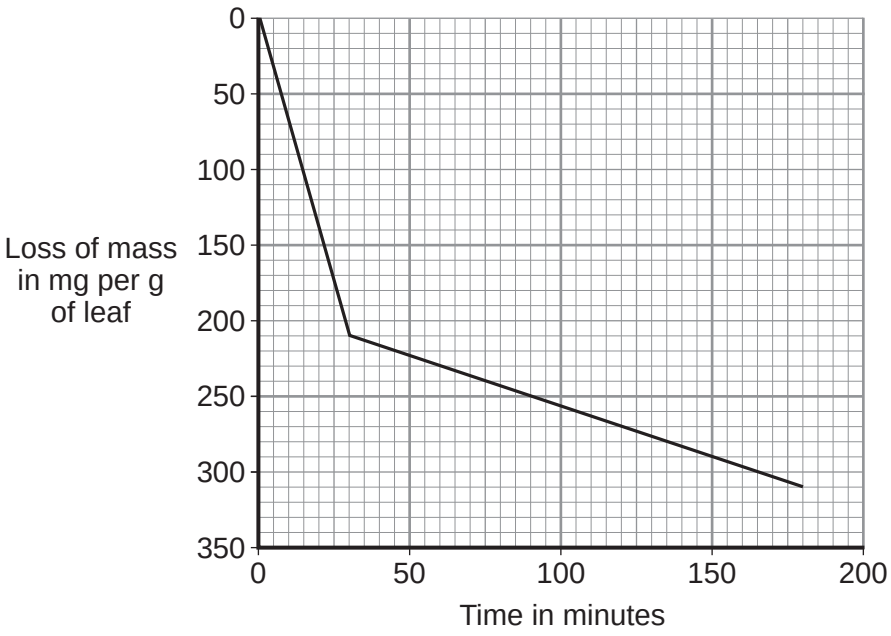
4.1.3.3 Active transport

Question 06 · continued

4 (c) Students investigated the loss of water vapour from leaves.

The students:
- cut some leaves off a plant
- measured the mass of these leaves every 30 minutes for 180 minutes.

The graph shows the students' results.



4 (c) (i) The rate of mass loss in the first 30 minutes was 7 milligrams per gram of leaf per minute.

Calculate the rate of mass loss between 30 minutes and 180 minutes.

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.....

Rate of mass loss = ... milligrams per gram of leaf per minute

(2 marks)

4 (c) (ii) The rate of mass loss between 0 and 30 minutes was very different from the rate of mass loss between 30 and 180 minutes.

Suggest an explanation for the difference between the two rates.

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(2 marks)

11

4.1.3.3 Active transport

Question 07

June 2017 | BL3HP | Original Q8 | Legacy

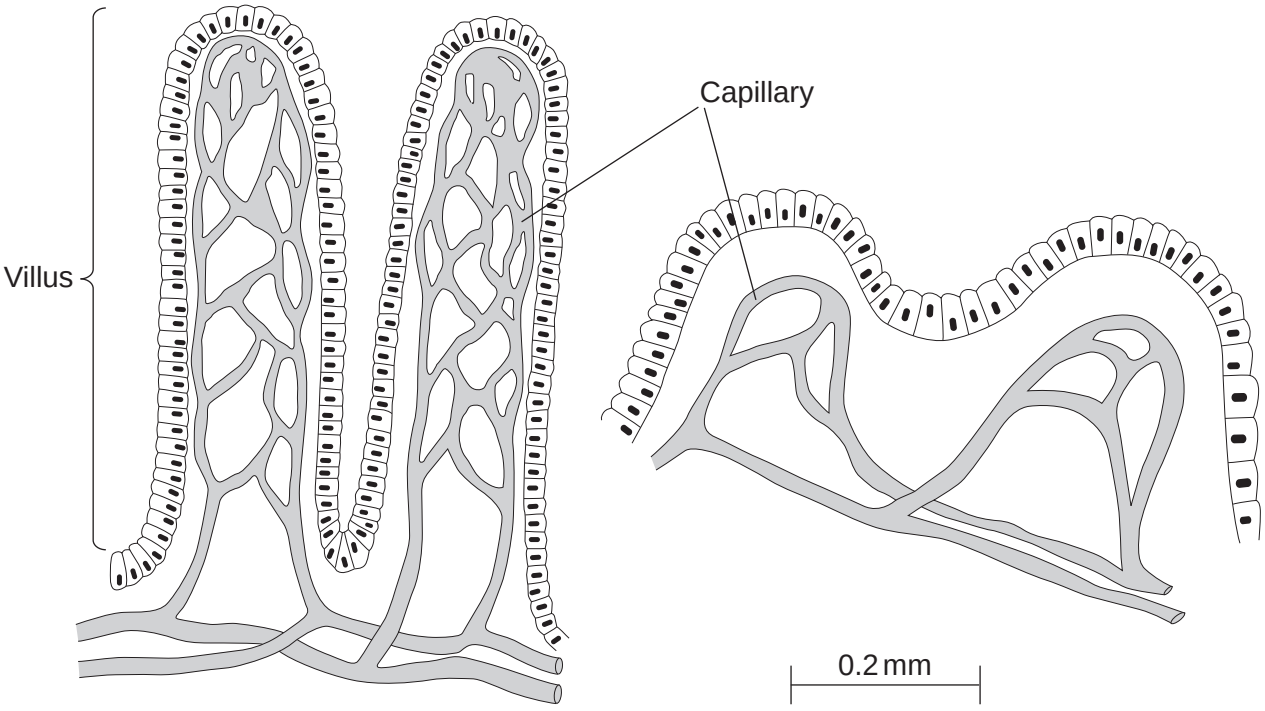
8 Some people have coeliac disease. Coeliac disease affects the small intestine.

Symptoms of coeliac disease include:

- weight loss
- low levels of vitamins and minerals in the body
- tiredness.

Figure 7 shows the lining of the small intestine of a healthy person and the lining of the small intestine of a person with coeliac disease.

Figure 7



4.1.3.3 Active transport

Question 07 · continued

8 (a) Explain how the changes in the villi of a person with coeliac disease may cause the person to lose weight and have low amounts of vitamins and minerals in their body.

[5 marks]

8 (b) Some of the uptake of glucose in the small intestine occurs by active transport.

Describe the process of active transport.

[2 marks]

7

4.1.3.3 Active transport

Question 08

June 2019 | 8461/1H | Original Q6

0 6 People with diabetes have difficulty controlling their blood glucose concentration.

0 6 . 1 Which part of the blood transports glucose?

[1 mark]

Tick (✓) **one** box.

- Lymphocytes ☐
- Plasma ☐
- Platelets ☐
- Red blood cells ☐

Glucose is often found in the urine of people with diabetes.

0 6 . 2 Name a chemical used to test for glucose.

[1 mark]

_____

0 6 . 3 Describe a test that could be used to show that a person's urine contains glucose.

[2 marks]

Test _____

_____

Positive result _____

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4.1.3.3 Active transport

Question 08 · continued

0 6 . 4 The body cells of a person with untreated diabetes lose more water than the body cells of a person who does **not** have diabetes.

Explain how diabetes can cause the body cells to lose more water.

[3 marks]

0 6 . 5 Glucose is absorbed into the blood in the small intestine by both diffusion and active transport.

Describe how the small intestine is adapted for efficient absorption.

[5 marks]

12

4.1.3.3 Active transport

Question 09

0 3 A student investigated osmosis in pieces of potato.

This is the method used.

1. Cut a piece of potato into a cube.
2. Record the mass of the cube.
3. Place the cube into a beaker containing 0.4 mol/dm^3 salt solution.
4. After some time, remove the cube and record the mass.
5. Calculate the change in the mass of the cube.
6. Repeat steps 1 to 5 using two more different concentrations of salt solution.

0 3 . 1 Evaluate the student's method.

You should include how the student could improve the validity of their results.

[6 marks]

4.1.3.3 Active transport

Question 09 · continued

0 3 . 2 Why would a potato cube placed into distilled water increase in mass?

[1 mark]

Tick (✓) **one** box.

- The solution in the potato cells was less concentrated than the distilled water. ☐
- The solution in the potato cells was more concentrated than the distilled water. ☐
- The volume of water in the potato cells was greater than the volume of distilled water. ☐
- The volume of water in the potato cells was less than the volume of distilled water. ☐

0 3 . 3 Active transport is another process used by potato cells.

Give **one** way active transport is different from osmosis.

[1 mark]

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8