AQA GCSE Biology | 8461

SPECIFICATION POINT 4.5.1

Homeostasis

Past-paper questions

Tier	**Higher**
Question groups	**7**
Available paper years	**2011–2024**

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.

4.5.1 Homeostasis

Question 01

March 2011 | BLY1AP | Original Q5 | Legacy

QUESTION FIVE

It is important to keep the internal conditions of the body constant.

5A Water and ions are both lost from the body in . . .

1 breath and sweat.

2 breath and urine.

3 breath, sweat and urine.

4 sweat and urine.

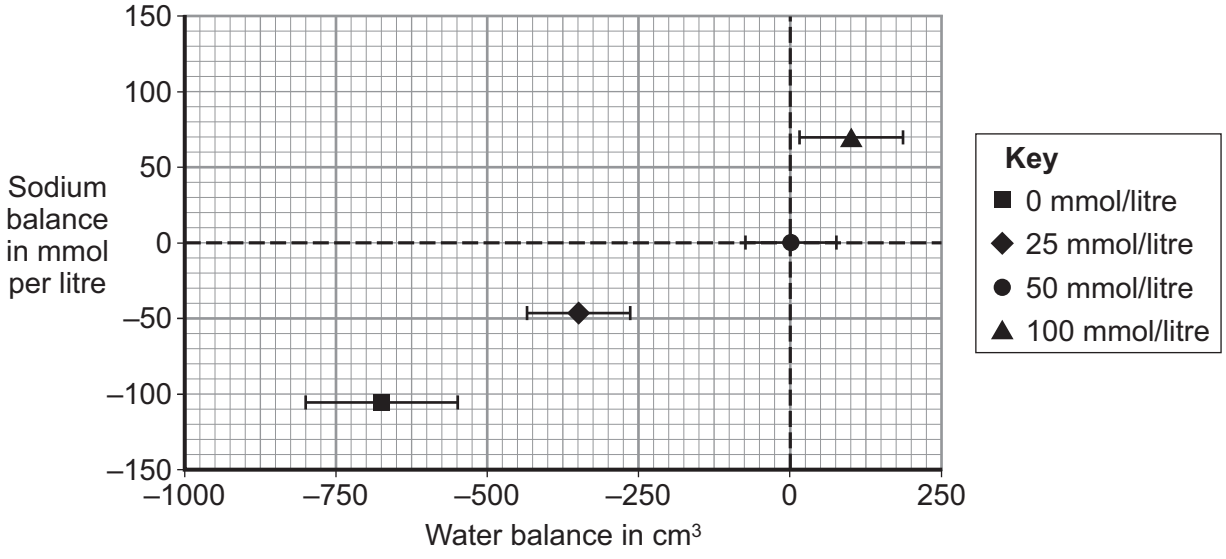
Scientists carried out an investigation to find the best concentration of sodium ions to use in a sports drink.

- The scientists dehydrated some athletes by getting them to exercise in hot conditions.
- Each athlete then drank a test drink containing one of the following concentrations of sodium ions:

Test drink **W** (water)	0 mmol per litre
Test drink **X**	25 mmol per litre
Test drink **Y**	50 mmol per litre
Test drink **Z**	100 mmol per litre

- After one hour, the scientists measured the water balance and the sodium balance of the blood of each athlete.

The results are shown in the graph.



4.5.1 Homeostasis

Question 01 · continued March 2011 | BLY1AP | Original Q5 | Legacy

The dashed lines on the graph show the normal water balance and the normal sodium ion balance of the body. The horizontal line at each plot shows the range of the water balance for that drink.

5B What was the range of the water balance for the 25 mmol per litre sodium ion drink?

1 50 cm^3

2 100 cm^3

3 175 cm^3

4 250 cm^3

5C The data shows that one litre of the best drink for restoring the balance of water and sodium ions contains . . .

1 0 mmol sodium ions.

2 25 mmol sodium ions.

3 50 mmol sodium ions.

4 100 mmol sodium ions.

5D If the water balance and the sodium ion balance of the body are not correct, . . .

1 enzymes will not work as effectively.

2 body cells will not work as efficiently.

3 body temperature will start to increase.

4 the kidneys will stop working.

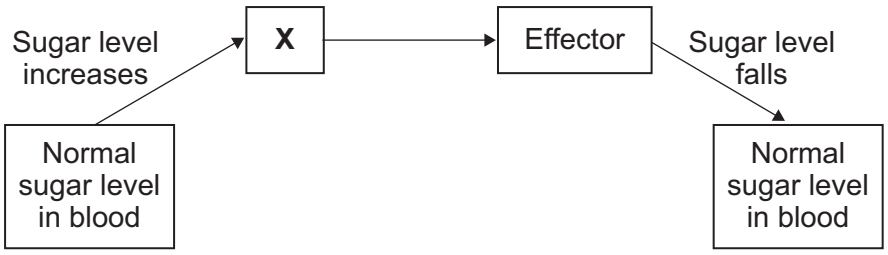
4.5.1 Homeostasis

Question 02

June 2011 | BLY1AP | Original Q3 | Legacy

QUESTION THREE

The diagram shows what happens to sugar levels in the blood after a meal.



3A Structure **X** is sensitive to increases in blood sugar levels.

Structure **X** is a . . .

1 synapse.

2 relay neurone.

3 motor neurone.

4 receptor.

3B Structure **X** sends information to the effector in the blood stream.

This information is sent as . . .

1 a hormone.

2 an enzyme.

3 a synapse.

4 a nerve impulse.

4.5.1 Homeostasis

Question 02 · continued June 2011 | BLY1AP | Original Q3 | Legacy

3C All effectors are . . .

1 glands.

2 neurones.

3 target organs.

4 muscles.

3D Sometimes, the organs controlling blood sugar concentration do not work properly and the sugar levels in the blood stay high.

This condition is called . . .

1 arthritis.

2 diabetes.

3 heart disease.

4 rubella.

4.5.1 Homeostasis

Question 03

June 2015 | BL1HP | Original Q7 | Legacy

7 This question is about the nervous system.

7 (a) Describe the function of receptors in the skin.

[2 marks]

.....

.....

.....

.....

7 (b) A response is caused when information in the nervous system reaches an effector.

7 (b) (i) There are two different types of effector.

Complete **Table 4** to show:

- the two different types of effector
- the response each type of effector makes.

[4 marks]

Table 4

Type of effector	Response the effector makes
1	....
2	....

7 (b) (ii) Some effectors help to control body temperature.

Give **one** reason why it is important to control body temperature.

[1 mark]

.....

.....

7

4.5.1 Homeostasis

Question 04

June 2016 | BL3HP | Original Q7 | Legacy

7 Humans keep their internal conditions almost constant.

Body temperature is kept within a narrow range.

When the core body temperature is too low, this is detected by the thermoregulatory centre in the brain.

Describe how the body responds when a decrease in core body temperature is detected.

[6 marks]

6

4.5.1 Homeostasis

Question 05

June 2017 | BL1HP | Original Q3 | Legacy

3 The human body responds to changes in internal conditions and external conditions.

3 (a) The water and ion content of the body must be controlled.

Ions are lost from the body in different liquids from different organs.

3 (a) (i) Complete **Table 1** to show **two** ways ions are lost from the body.

[4 marks]

Table 1

Liquid	Organ
_____	_____
_____	_____

3 (a) (ii) How are the ions which are lost from the body replaced?

[1 mark]

_____

_____

Question 3 continues on the next page

4.5.1 Homeostasis

Question 05 · continued

3 (b) **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Reflexes allow humans to respond to stimuli (changes in the environment).

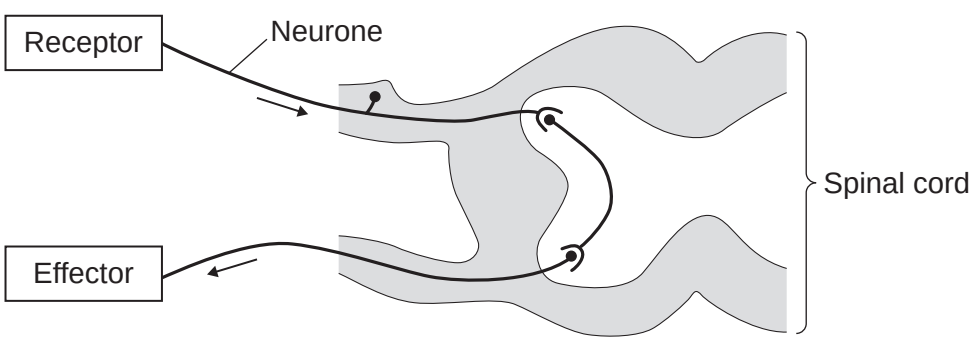
One example of a reflex is when a finger touches a hot kettle and the arm is pulled away.

Sense organs contain receptors that detect stimuli.

Effectors are muscles or glands which respond.

Figure 2 is a diagram of a simple reflex pathway.

Figure 2



Describe how a simple reflex works.

Your answer should include:

- one type of receptor and the stimulus that the receptor detects
- how information is passed from the receptor to the effector.

[6 marks]

4.5.1 Homeostasis

Question 06

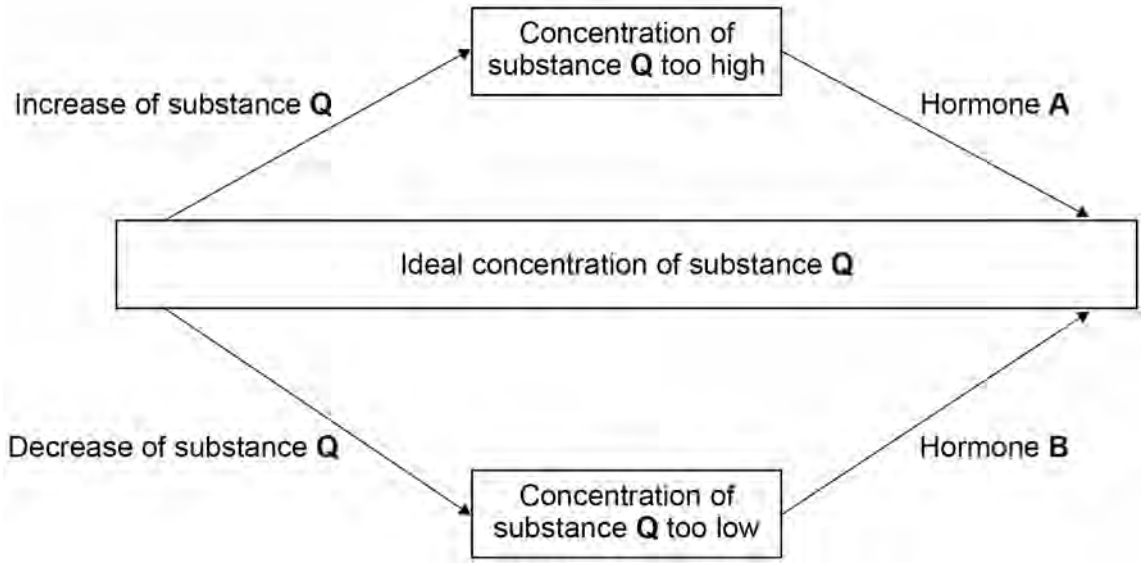
0 5 Homeostasis is the regulation of the body's internal conditions.

Many internal conditions are controlled by hormones.

Homeostasis works by negative feedback control.

0 5 . 1 **Figure 8** shows how the concentration of substance **Q** in the blood is controlled by negative feedback.

Figure 8



Explain how the concentration of substance **Q** in the blood is controlled by negative feedback.

Use information from **Figure 8**.

[3 marks]

4.5.1 Homeostasis

Question 06 · continued

0 5 . 2 Thyroxine is a hormone produced by the thyroid gland.

A decrease in body temperature causes an increase in thyroxine production.

Explain how the production of thyroxine causes an **increase** in body temperature.

[2 marks]

Question 5 continues on the next page

0 5 . 3 ADH is a hormone made by the pituitary gland.

ADH controls how much water is reabsorbed from the kidney tubules.

Table 2 shows effects of ADH.

Table 2

Concentration of ADH in the blood in nanograms/dm^3	Concentration of dissolved substances in urine in arbitrary units	Rate of urine production in cm^3/minute
0.0	50	20.0
1.25	700	8.8
2.50	980	3.9
3.75	1110	1.8
5.00	1170	0.9

The concentration of ADH in a man's blood was 3.75 nanograms/dm^3.

The concentration of ADH in his blood decreased to 1.25 nanograms/dm^3.

Explain how the decrease in the concentration of ADH would cause the changes to the urine shown in **Table 2**.

[4 marks]

9

4.5.1 Homeostasis

Question 07

June 2024 | 8461/2H | Original Q8

0 8 Conditions inside and outside of the human body often change.

Homeostasis helps the human body to survive changing conditions.

0 8 . 1 Explain what is meant by the term 'homeostasis'.

[2 marks]

The kidneys have an important role in homeostasis.

0 8 . 2 Describe what happens to **glucose**, **protein** and **urea** in the kidneys.

[4 marks]

4.5.1 Homeostasis

Question 07 · continued

0 8 . 3 Explain how ADH affects the production and concentration of urine by the kidneys.

[4 marks]

10

Turn over for the next question