

GCSE Biology (9 – 1)

Homeostasis

Name:

Group:

Instructions

- Read each question carefully before you begin to answer it.
- Use black ink or black ball-point pen for your answers.
- Fill in the boxes at the top of this page with your name and group.
- Attempt to answer every question in the booklet.
- Answer the questions in the spaces provided – there may be more space than you need in some answer spaces.
- Calculators may be used for this booklet.
- For any calculations, you **must** show all your working.
- Any and all drawings or graphs should be completed in pencil.



For markers use	
Question	Mark
1	/4
2	/16
3	/18
4	/13
5	/17
Total	/68
%	
Grade	

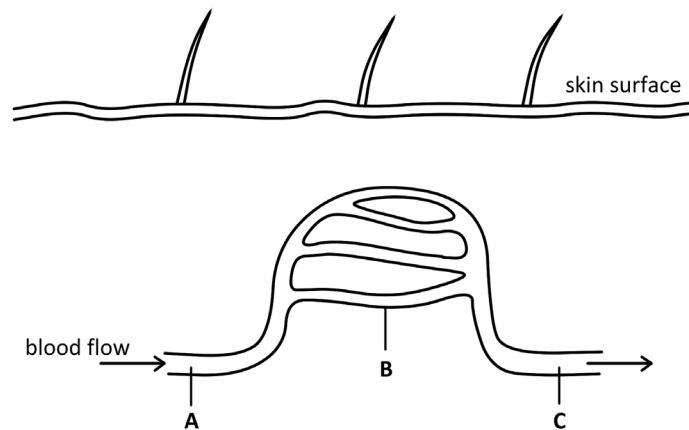
Information

- The maximum mark for this paper is 68 marks.
- The marks for each question are shown in brackets.
- Please be aware that good English and clear presentation are required in your answers.



1. Homeostasis is the maintenance of a stable internal environment in living organisms despite changes in external or internal conditions. Circle the letter of the correct answer for each question below.

a) The figure below shows some arterioles close to the surface of the skin.



When vasoconstriction occurs at **A**, what will happen to the flow of blood through **B** and **C**?

- A** Increases through B and increases through C.
- B** Decreases through B and increases through C.
- C** Increases through B and decreases through C.
- D** Decreases through B and decreases through C.

(1 mark)

b) Which of the following scenarios would **least** likely trigger a significant release of ADH (antidiuretic hormone) from the pituitary gland?

- A** Consuming a very salty meal without drinking much fluid.
- B** Sweating profusely during intense physical exercise on a hot day.
- C** Drinking a large volume of dilute fluids over a short period.
- D** Experiencing a sudden and significant drop in blood pressure due to severe bleeding.

(1 mark)

c) Which part of the brain coordinates the body's homeostasis response?

- | | | | |
|-----------------|--------------|------------|----------|
| A | B | C | D |
| Pituitary Gland | Hypothalamus | Cerebellum | Cerebrum |

(1 mark)

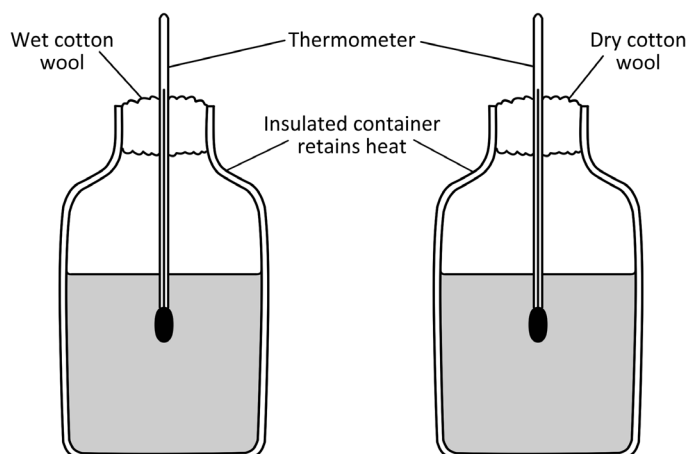
d) Which part of the kidney nephron is affected by antidiuretic hormone (ADH)?

- | | | | |
|---------------|------------|-----------------|-----------------|
| A | B | C | D |
| Loop of Henle | Glomerulus | Collecting duct | Bowmans capsule |

(1 mark)

(Total for Question 1 is 4 marks)

2. A student set about investigating the effect of sweating on the temperature of the body. The student set up two beakers for the investigation as shown in the figure below.



Container 1 was carefully sealed with some wet cotton wool.

Container 2 was carefully sealed with some dry cotton wool. Boiling water was added to each of the . The temperature of the water in each flask was recorded every 5 minutes for 20 minutes.

- a) State **two** variables that would need to be controlled to ensure this investigation is valid.

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(2 marks)

The results of the student's investigation is shown in the table below.

Time (minutes)	Container 1 (°C)	Container 2 (°C)
0	100	100
5	72	93
10	60	85
15	45	74
20	33	65

- b) Calculate the mean temperature for container 1 during the investigation.

Mean = ...

(2 marks)

- c) Calculate the range of temperature range for both container 1 and container 2.

Range of container 1 = ...

Range of container 2 = ...

(2 marks)

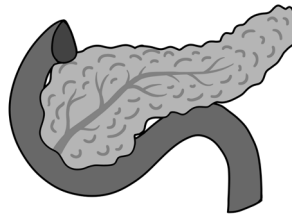
This image shows a full page of a handwriting practice worksheet. It consists of numerous horizontal rows, each defined by two parallel dotted lines. The rows are evenly spaced and extend across the entire width of the page, providing a guide for letter height and placement. There is no text or other markings on the page.

(6 marks)

(Total for Question 2 is 16 marks)

3. This question is about glucoregulation.

The figure below shows an organ that is very involved in glucoregulation.



a) Identify the organ shown above.

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(1 mark)

b) Name the **two** hormones that this organ produces that are involved in glucoregulation.

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(2 marks)

c) Explain why it is important for the body to maintain a stable blood glucose concentration.

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(3 marks)

Before the 1920's doctors would often taste urine to determine if a patient had diabetes.
If the urine tasted sweet this meant the urine contained glucose. This could indicate diabetes.

d) Describe the chemical test that doctors could use in the present to test for glucose in a sample of urine.

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(3 marks)

The doctor suspects their patient has type 2 diabetes.

- e) State the cause of type 2 diabetes and suggest **two** ways it can be treated.

[illegible]

(3 marks)

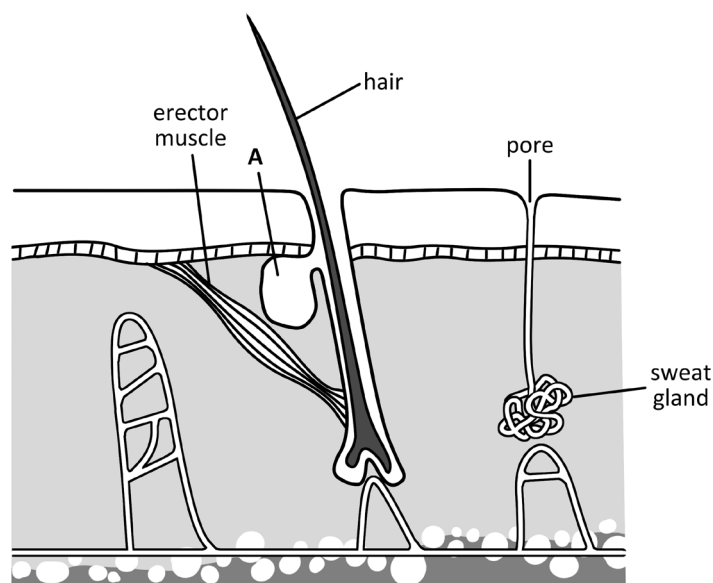
- f) Describe the roles of the pancreas and the liver in maintaining stable blood glucose levels in the body

[illegible]

(6 marks)

(Total for Question 3 is 16 marks)

4. The figure below shows a section of human skin.



a) What is the term given to the raising of hair follicles in the skin.

(1 mark)

b) Explain how this process works and how it contributes to maintaining body temperature. Include in your answer an explanation of when and why this process occurs in response to changes in skin temperature.

(6 marks)

The skin is also involved in the process of sweating, which helps regulate body temperature.

- c) Explain how sweating contributes to maintaining the temperature of the body.

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(3 marks)

- d) Which region of the brain is involved with coordinating responses in homeostasis.

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(1 mark)

- e) Explain why is it important to maintain body temperature within a narrow range.

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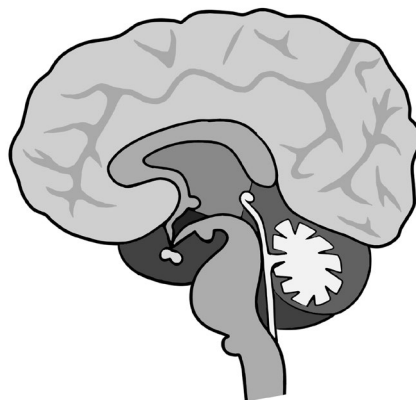
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(2 marks)

(Total for Question 4 is 13 marks)

5. The figure below shows a section through the brain.



a) What part of the brain regulates homeostasis, particularly in relation to osmoregulation?

(1 mark)

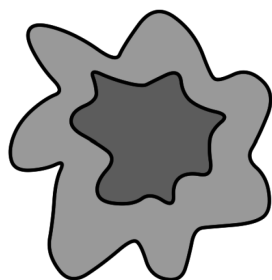
b) Name the hormone produced by this part of the brain that affects the kidney.

(1 mark)

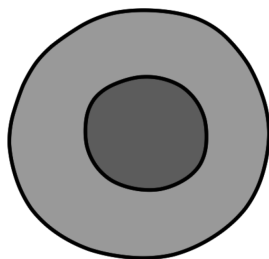
c) Describe how the kidney responds to high and low levels of this hormone and give the effect this would have on the production of urine.

(6 marks)

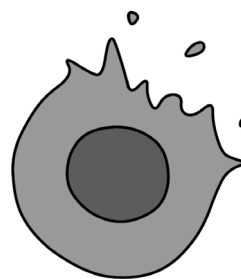
The figure below shows an animal cell in three different solutions.



Cell 1



Cell 2



Cell 3

- d) Identify each of these cells and explain in terms of osmosis, how each cell has arrived in its current condition.

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(4 marks)

- e) Explain why maintaining osmoregulation is crucial for animal cells.

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(4 marks)

- f) State why plant cells are not as affected by changes in water concentration compared to animal cells.

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(1 mark)

(Total for Question 5 is 17 marks)