



Resources available from

**kickstart  
tutors**

Student number

--	--	--	--	--

Name \_\_\_\_\_

Date \_\_\_\_\_

Attempt/Time taken \_\_\_\_\_

# GCSE BIOLOGY

Topic Paper: 5 Homeostasis and response Section 2  
Part 2

---

Time allowed: 50 minutes

## Materials

For this paper you must have:

- the Periodic Table/Data Sheet, provided as an insert (enclosed)
- a ruler with millimetre measurements
- a calculator, which you are expected to use where appropriate.

## Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- All working must be shown.
- Do all rough work in this book. Cross through any work you do not want to be marked.

## Information

- The Periodic Table/Data Sheet is provided as in insert.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions you need to make sure that your answer:
  - is clear, logical, sensibly structured
  - fully meets the requirements of the question
  - shows that each separate point or step supports the overall answer.



**45 Marks**



**Q7.** Use your knowledge of how the kidney works to answer the following questions.

- (a) Blood plasma contains mineral ions, glucose, urea and proteins.

Explain why urine contains mineral ions and urea, but **no** glucose or protein.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

**(4)**

- (b) A man ate and drank the same amounts of the same substances and he did the same amount of exercise on two different days. On one of the two days the weather was hot and on the other day the weather was cold.

The man's urine contained a higher concentration of mineral ions and urea on the hot day than on the cold day.

Explain why.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

**(4)**

**(Total 8 marks)**



**Q8.** Blood is part of the circulatory system.

(a) (i) Give **one** function of white blood cells.

.....  
.....

(1)

(ii) Which of the following is a feature of platelets?

Tick (✓) **one** box.

They have a nucleus.

They contain haemoglobin.

They are small fragments of cells.

(1)

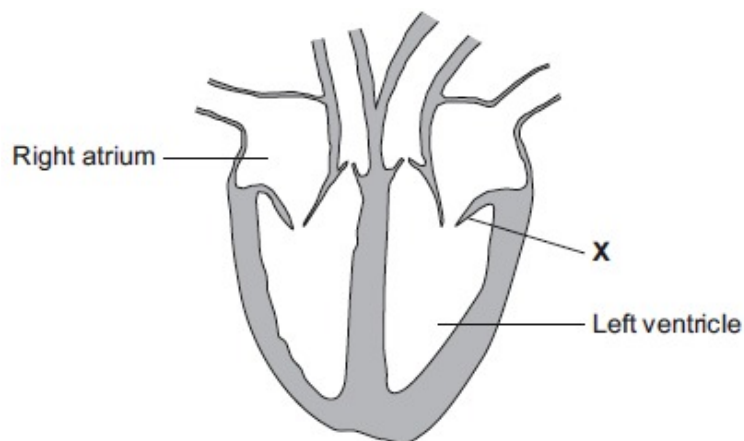
(b) Urea is transported by the blood plasma from where it is made to where the urea is excreted.

Complete the following sentence.

Blood plasma carries urea from where it is made in the .....  
to the ..... where the urea is removed from the blood.

(2)

(c) The illustration shows a section through the human heart.



Structure **X** is a valve. If valve **X** stops working, it may need to be replaced.

A scientist is designing a new heart valve. The scientist knows that the valve must be the correct size to fit in the heart.



Suggest **two** other factors the scientist needs to consider so that the newly designed valve works effectively in the heart.

.....  
.....  
.....  
.....

(2)  
(Total 6 marks)

**Q9.** Humans maintain an almost constant body temperature.

(a) Describe the role of blood vessels in the control of body temperature.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

(4)



- (b) An athlete can run a marathon in 2 hours 15 minutes on a dry day in outside temperatures up to 35 °C.

If the air is dry, his body will **not** overheat.

In humid conditions the same athlete can run the marathon in the same time. However, in humid conditions, if the outside temperature goes over 18 °C then his body **will** overheat.

Suggest an explanation for the athlete overheating in humid conditions.

.....

.....

.....

.....

.....

.....

.....

.....

(3)  
(Total 7 marks)

- Q10.** Urine consists of water, ions and other substances such as urea. Urine is formed in the kidney by filtering the blood. The diameter of the pores in the filter is about 6 nanometres.

The table shows the diameters of the molecules of some of the substances in the blood.

Substance	Diameter of molecule in nanometres
A	10 to 20
B	1
C	0.6
D	0.5
E	0.2

Use information from the table and your own knowledge to answer the questions.

- (a) (i) Which substance, **A, B, C, D** or **E**, is protein?

(1)



(ii) Protein is **not** found in the urine of a healthy person.

Explain why.

.....  
.....  
.....  
.....  
.....  
.....

(2)

(b) Substance **B** is **not** found in the urine of a healthy person.  
Suggest an explanation for this.

.....  
.....  
.....  
.....  
.....  
.....

(2)

(c) Haemolytic anaemia is a disease in which some of the red blood cells burst open.

Small amounts of haemoglobin may be found in the urine of a person suffering from haemolytic anaemia.

The diameter of a haemoglobin molecule is 5.5 nanometres.

Haemoglobin is **not** found in the urine of a healthy person, but haemoglobin can be found in the urine of a person with haemolytic anaemia.

Explain why.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

(3)

(Total 8 marks)





(iii) After 10.30, the core body temperature decreased.

Explain how changes in the blood vessels supplying the skin caused the skin surface temperature to increase.

.....  
.....  
.....  
.....  
.....  
.....

(2)

(b) During the race, the cyclist's blood glucose concentration began to decrease.

Describe how the body responds when the blood glucose concentration begins to decrease.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

(3)

(Total 12 marks)

**Q12.** (a) Which organ in the body monitors the concentration of glucose (sugar) in the blood?

.....

(1)





- (b) In a healthy person, insulin prevents high levels of glucose in the blood.  
To make insulin, cells in the pancreas need amino acids.

Amino acids cannot be stored in the body.

Describe, as fully as you can, what happens to amino acids that cannot be stored in the body.

.....

.....

.....

.....

.....

.....

.....

.....

.....

(3)  
(Total 4 marks)