

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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I declare this is my own work.

# GCSE BIOLOGY

# H

Higher Tier      Paper 2H

Predicted paper 2023

Morning

Time allowed: 1 hour 45 minutes

## Materials

For this paper you must have:

- a ruler
- a scientific calculator.

## Instructions

- Use black ink or black ball-point pen.
- Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

## Information

- The maximum mark for this paper is 100.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

## For Examiner Use

Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	

Answer **all** questions in the spaces provided.

**0 1 . 1** Homeostasis maintains optimal conditions for enzyme action and all cell function

What does this include in the human body?

**[3 marks]**

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**0 1 . 2** Outline the differences between the nervous and endocrine systems

**[3 marks]**

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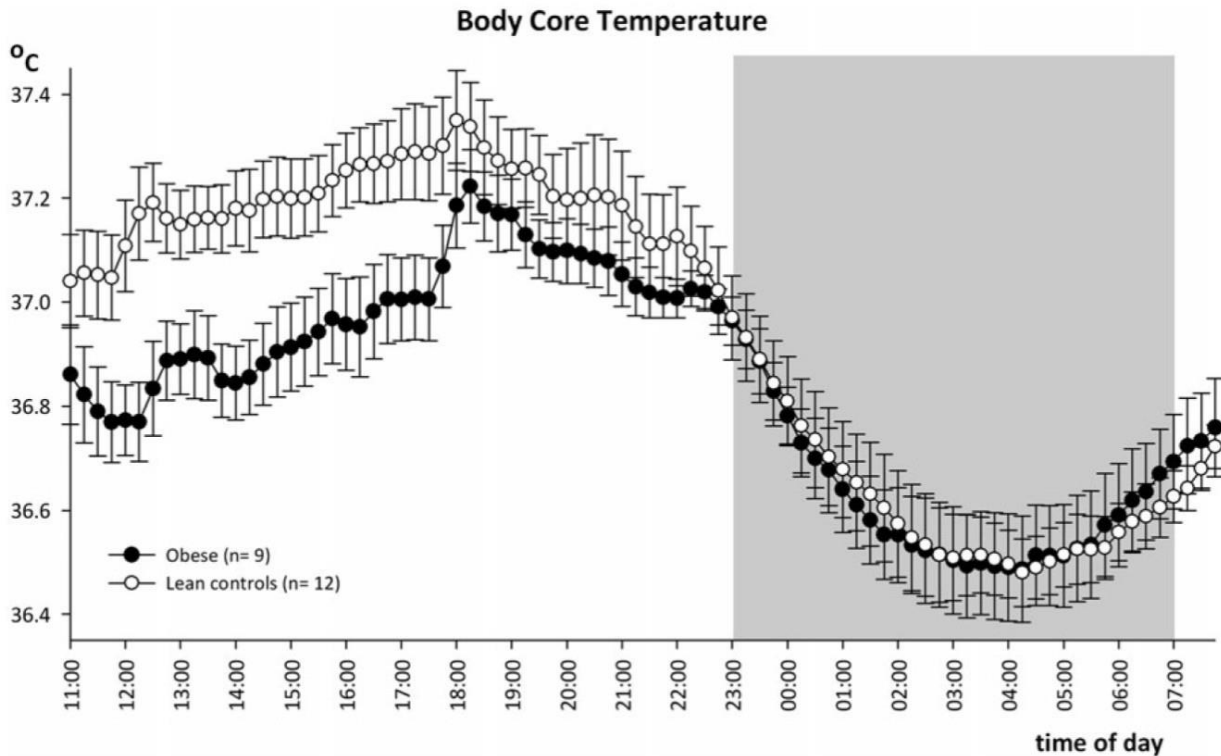
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Core body temperature fluctuates throughout the day to maintain the optimum conditions for cellular activity

Figure 1 shows the fluctuation

**Figure 1**



**0 1 . 3** Which part of the brain is responsible for control of core body temperature?

[1 mark]

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**0 1 . 4** Describe the trend shown in the graph above for core body temperature throughout the day.

[3 marks]

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**0 1 . 5** A man is running a marathon on a warm day with low humidity

Suggest how the body of the man will react to the stimulus in order to cool the man down

**[4 marks]**

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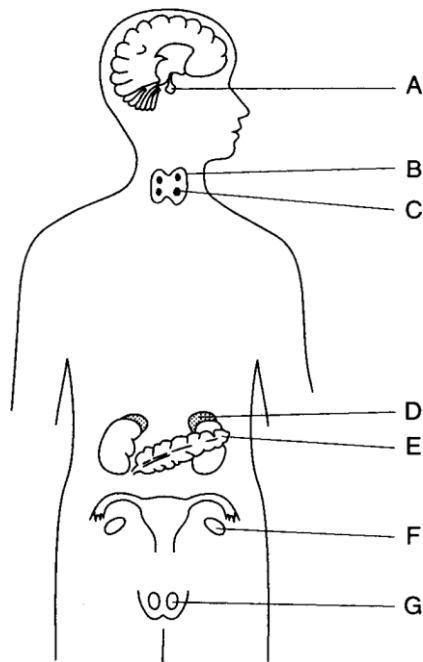
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**0 1 . 6** Which letter is the correct label for Adrenal Glands?

**[1 mark]**

Answer \_\_\_\_\_

**0 2 . 1** Describe two differences between type 1 and 2 diabetes

**[2 marks]**

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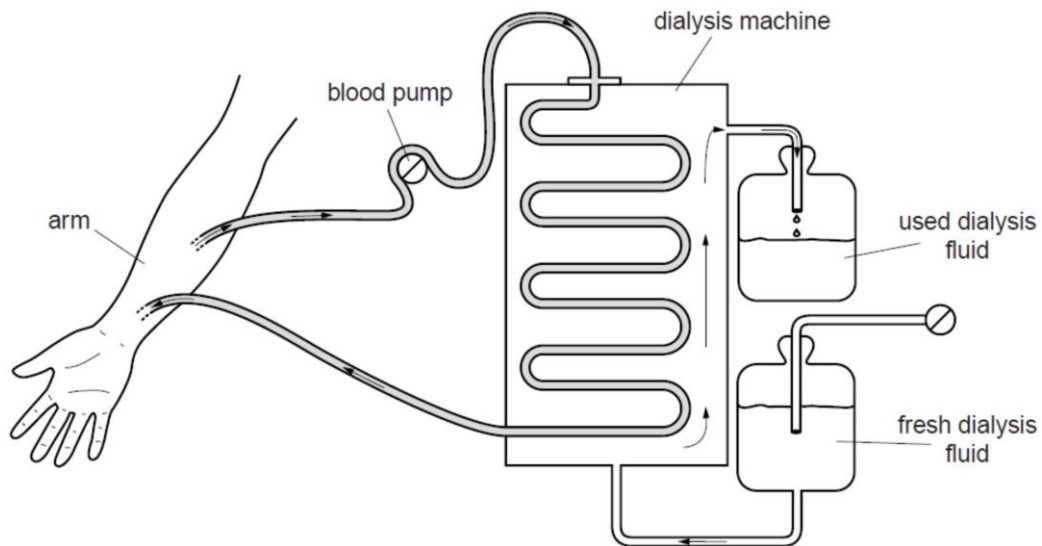


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Dialysis can be used to treat those who suffer from kidney failure

Figure 1 shows a dialysis machine

**Figure 1**



**0 2 . 2** Explain how toxic waste substances are removed from the bloodstream during dialysis

**[4 marks]**

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**0 2 . 3** State two advantages of a kidney transplant instead of dialysis

**[2 marks]**

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**0 2 . 4** Define the term 'deamination'

**[1 mark]**

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**0 2 . 5** Describe the role of the kidneys in selective reabsorption to produce urine

**[5 marks]**

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0 3

This question is about plant hormones

0 3 . 1

Suggest what is meant by a negative gravitropic response

[2 marks]

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0 3 . 2

Auxins are a well-known form of plant hormone used by horticulturalists. However, there are a large number of other essential plant hormones. Match each plant hormone with its correct definition.

Ethene

Auxins

Gibberellin

To control cell  
division and  
ripening of fruits

To inhibit or  
promote cell  
elongation in  
plant cuttings

To kill harmful  
pathogens

To initiate seed  
germination

To reduce the rate  
of fruit ripening

A student wants to investigate the effect of gravity on some newly germinated seedlings.

Here is the student's method:

1. Measure the length of the root of each of 20 bean seedlings.
2. Pin 10 seedlings each facing a **different** direction onto moist cotton wool in apparatus **A**
3. Pin 10 seedlings each facing the **same** direction onto moist cotton wool in Apparatus **B**
4. Leave sample **A** in a dark cupboard and sample **B** next to window
5. After the 2 days:
  - measure the length of the root of each seedling
  - make a drawing to show the appearance of each seedling

**0 3 . 3** Suggest an error in the student's method

**[2 marks]**

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**0 3 . 4** Some of the seedlings in the student's investigation were exposed to light.

Explain how some of shoots from the seedlings began to bend towards the light

**[3 marks]**

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outside the  
box

**04.1** Why does asexual reproduction lead to genetically identical offspring?

**[2 marks]**

**0 4 . 2** Outline the similarities and differences between meiosis and mitosis

**[4 marks]**

0 4 . 3

Describe how the understanding of the human genome can be used to trace human migration patterns over history, helping scientists to better understand inheritance.

[5 marks]

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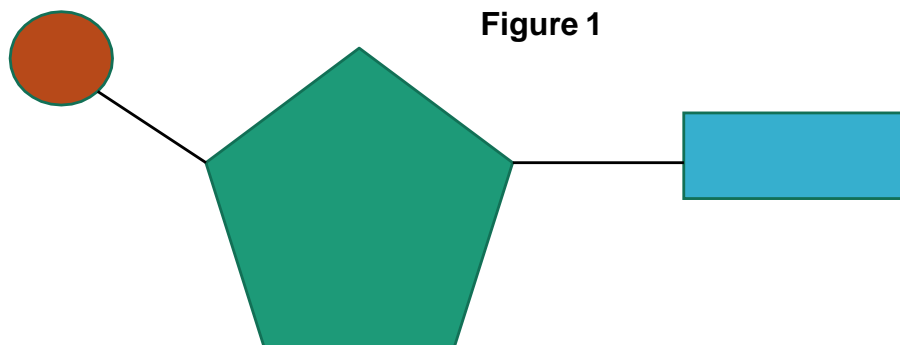
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0 4 . 4

**Figure 1** shows the structure of a nucleotide

Label the phosphate group with an X

[1mark]



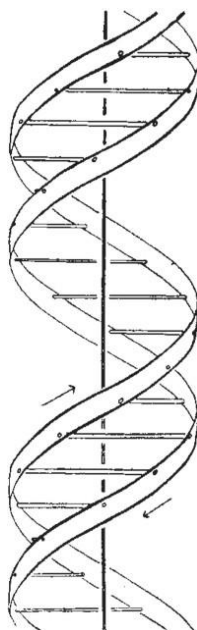
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The genetic material in the nucleus of a cell is composed of DNA

Describe the structure of a molecule of DNA such as **Figure 2**

**[6 marks]**

## Figure 2

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins or other markings on the paper.

**0 4 . 6** What is a genotype?

**[1 mark]**

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**0 4 . 7** Define cystic fibrosis and explain how it can lead to damage of the lungs in the long term

**[3 marks]**

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Explain why both parents of a child have to be carriers of the allele for cystic fibrosis for it to be inherited by the child

You should use a genetic diagram in your answer

**[4 marks]**

A diagram showing a 2x2 grid of squares. Above the grid are two rectangles. To the left of the grid are two rectangles. The top-left square is shaded gray.

0 5 . 1

## What is an ecosystem?

**[2 marks]**

0	5	.	2
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### Explain how 3 abiotic factors affect communities

**[6 marks]**

- 0 5 . 3 Many households recycle organic waste and put it into compost heaps  
Compost is produced by mixing soil and this waste  
Many compost heaps have air holes. Explain why.

[3 marks]

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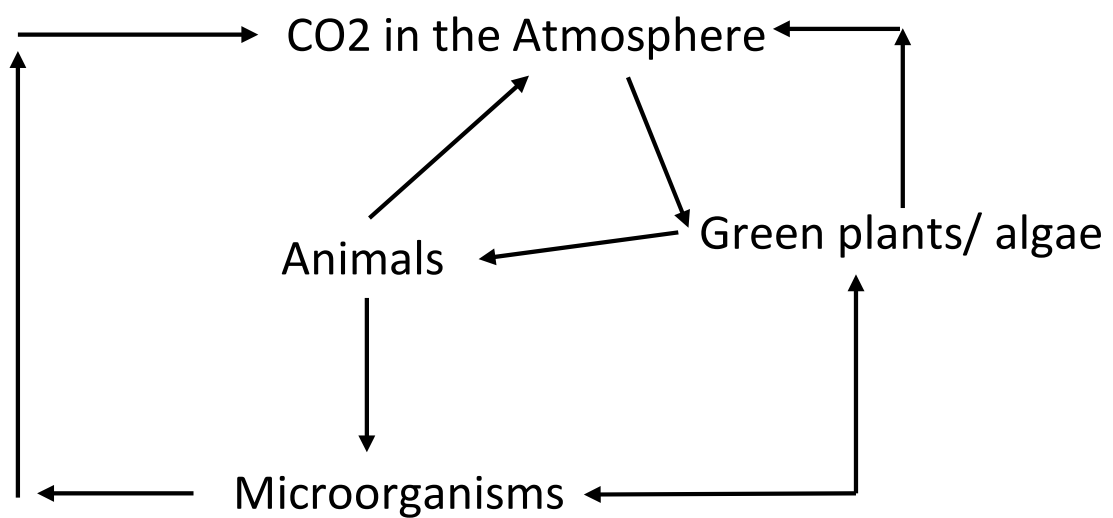
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- 0 5 . 4 The diagram below illustrates part of the carbon cycle  
Explain how the carbon from organisms that die is recycled

[4 marks]



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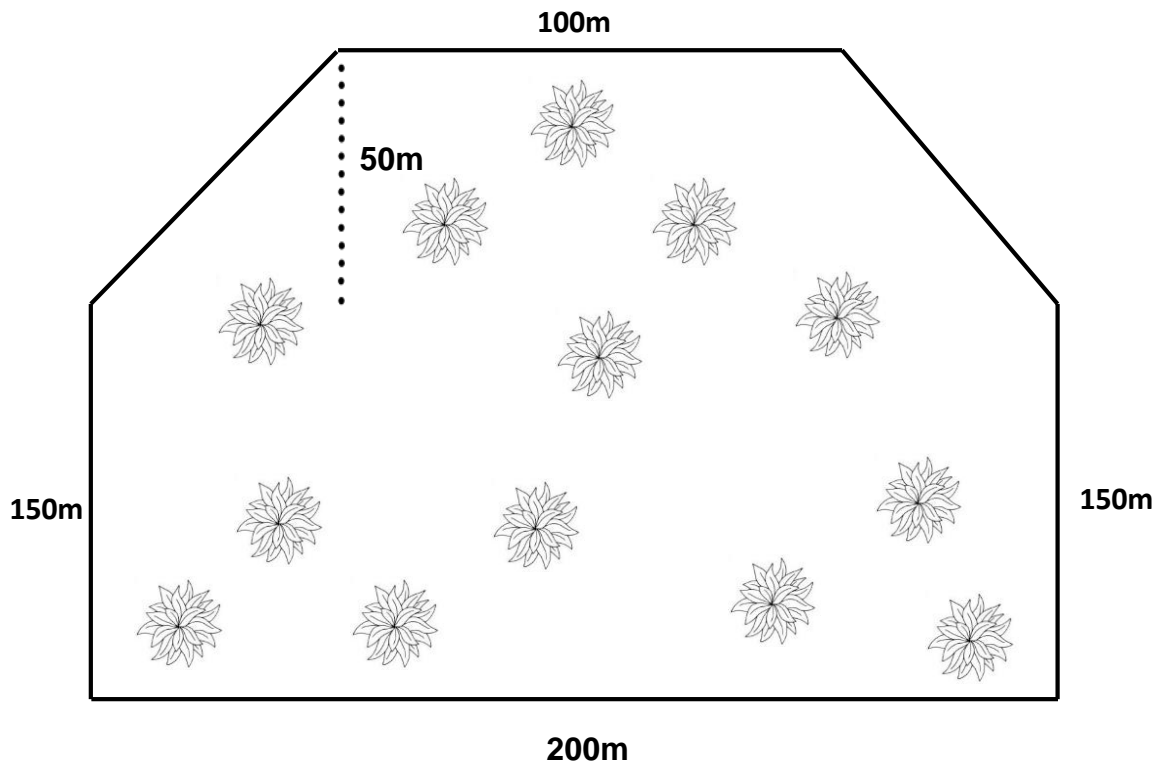
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**0 6**

Some students investigated the size of a distribution and abundance of daises in some woods



**0 6 . 1**

Calculate the area of the woodland.

Leave your answer in **m<sup>2</sup>**

**[4 marks]**

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Answer \_\_\_\_\_ **m<sup>2</sup>**



The students:

- placed a 1 m × 1 m square quadrat at 5 in the woodland
- counted the number of daisies plants in each quadrat.

Below shows a table of the results

Quadrat number	Number of daisies
1	3
2	7
3	1
4	3
5	4

**0 6 . 2** Suggest how the student's investigation could be improved

**[1 mark]**

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**0 6 . 3** Using the data in the table and the diagram above work out an estimate for the number of daisies in the field

**[5 marks]**

Answer in standard form

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Answer \_\_\_\_\_

0 6 . 4

Evaluate the similarities and differences in the information gained from quadrats and transects

[4 marks]

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0 6 . 5

Below is an image of a chicken farm  
Suggest two ways in which the efficiency of food production is maximized



Source: <https://www.theguardian.com/uk>

[2 marks]

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Answer \_\_\_\_\_

0 6 . 6

Methods of farming such as this have become increasingly more necessarily with the rapidly expanding population

Give three reasons why the population has grown so quickly over the last few hundred years

**[3 marks]**

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