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Student number

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Name \_\_\_\_\_

Date \_\_\_\_\_

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

# GCSE BIOLOGY

Topic Paper: 7.4 Trophic levels in an ecosystem (biology only)  
Part 2

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Time allowed: 45 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

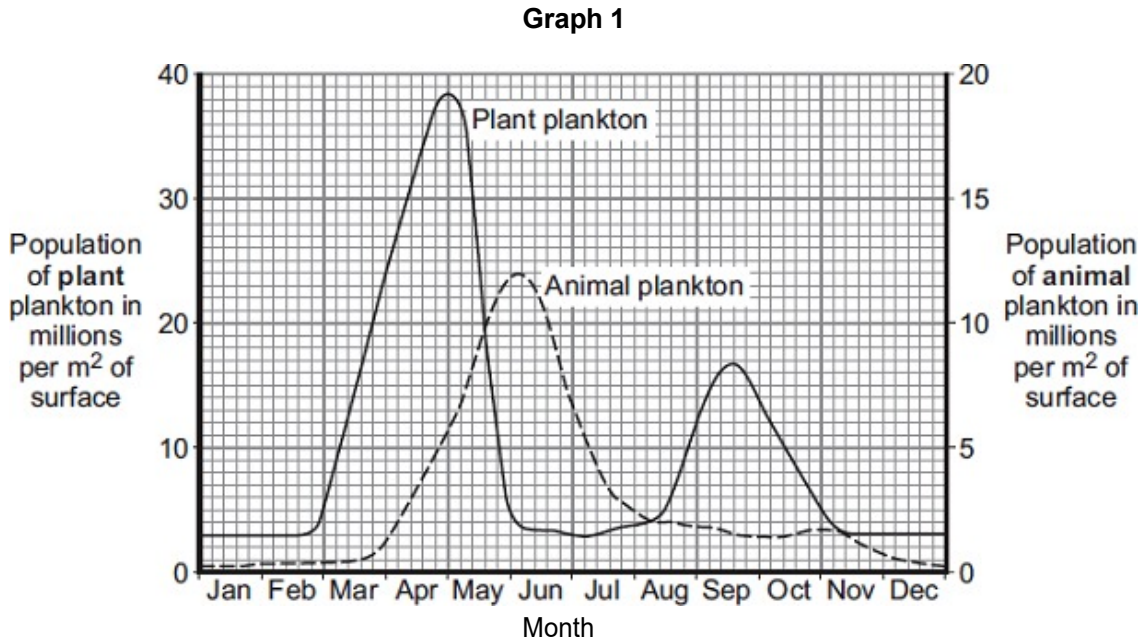
- The Periodic Table/Data Sheet is provided as in insert.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions you need to make sure that your answer:
  - is clear, logical, sensibly structured
  - fully meets the requirements of the question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



**44 Marks**

**Q8.** Plankton live in the sea.  
Animal plankton eat plant plankton.

**Graph 1** shows how the populations of the plankton change through the year in the seas around the UK.



(a) Basking sharks eat animal plankton. Basking sharks grow up to 8 metres long.

Look at the diagram and **Graph 1**.

Which is the correct shape for the pyramid of biomass to show the relationship between plant plankton, animal plankton and basking sharks, in June?

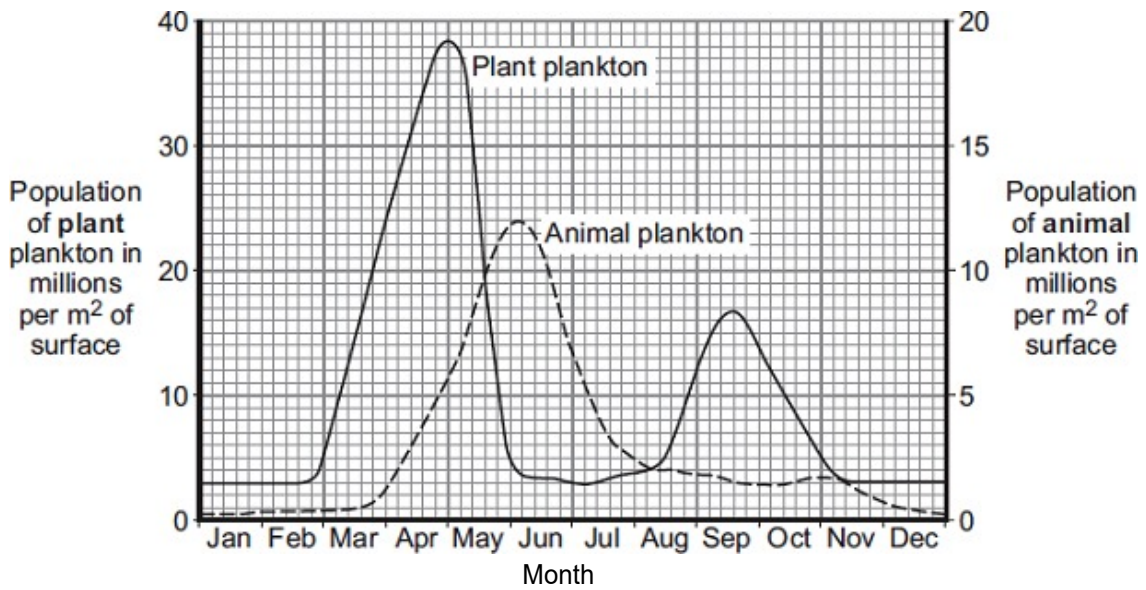
Tick (✓) **one** box.

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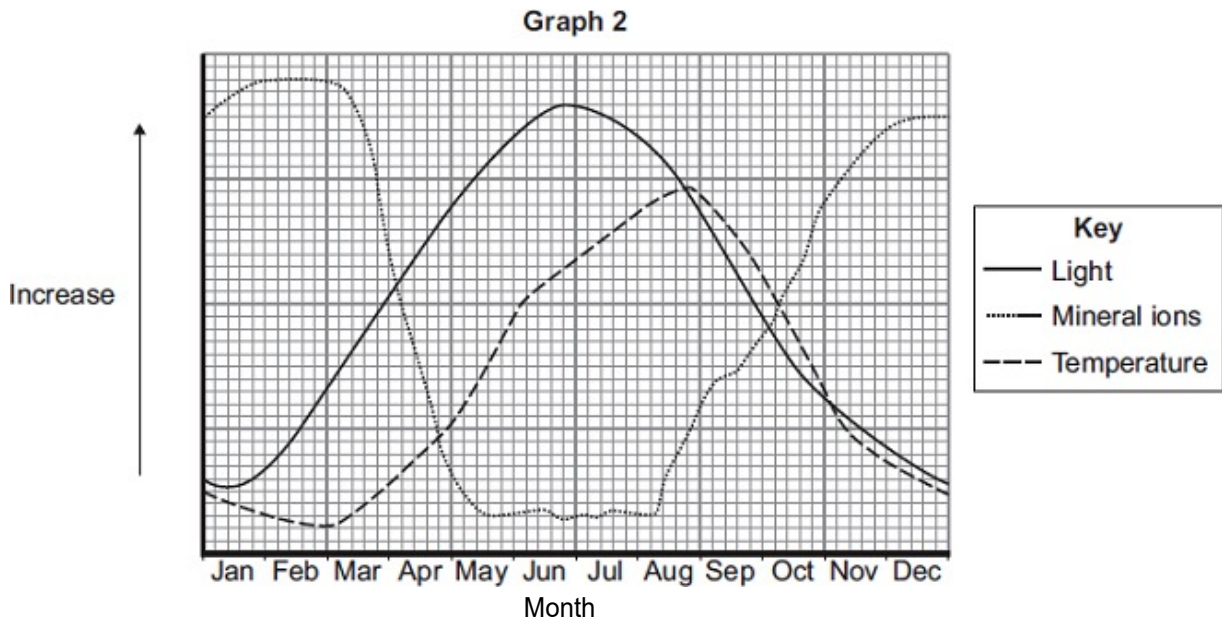
(1)



Graph 1 is repeated here to help you answer the following questions.



Graph 2 shows changes in some of the conditions in the upper layers of the sea around the UK.



(b) The population of plant plankton increases between February and April.

Suggest **one** reason for the increase.

Explain your answer.

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(2)



(c) The population of animal plankton changes between April and July.

Suggest explanations for the changes.

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(2)

(d) The concentration of mineral ions changes between February and December.

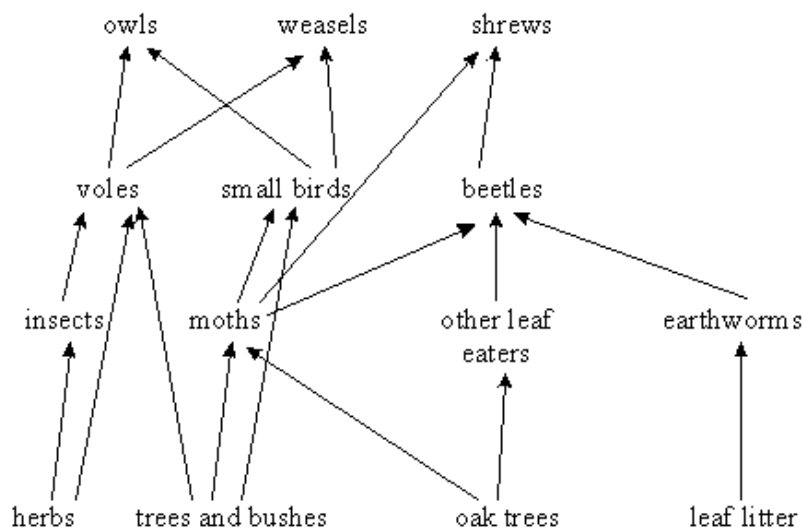
Suggest explanations for the changes.

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(3)

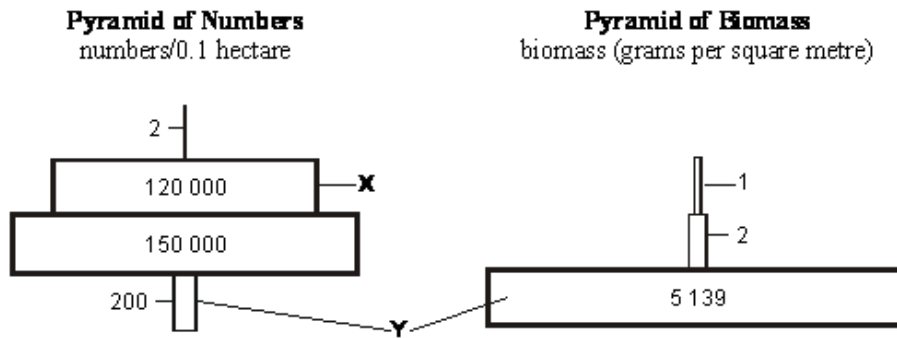
(Total 8 marks)

**Q9.** The diagram below shows a food web for a wood.





- (a) The diagrams below show a pyramid of the numbers and a pyramid of the biomass for 0.1 hectare of this wood.



- (i) Name **one** organism from the level labelled X.

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(1)

- (ii) Explain, as fully as you can, why the level labelled Y is such a different width in the two pyramids.

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(3)



- (b) Explain, as fully as you can, what eventually happens to energy from the sun which is captured by the plants in the wood.

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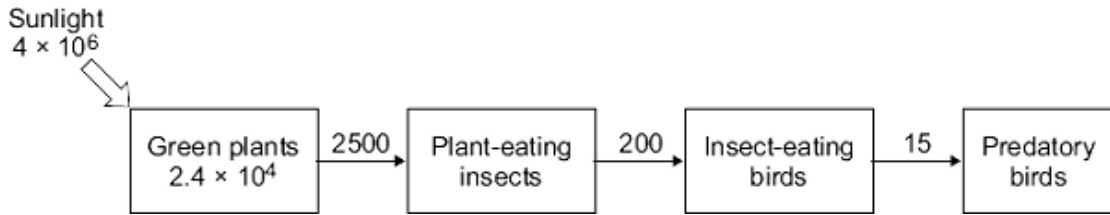
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(10)  
(Total 14 marks)



**Q10.** The diagram shows the annual flow of energy through a habitat.

The figures are in  $\text{kJ m}^{-2}$ .



- (a) (i) Calculate the percentage of the energy in sunlight that was transferred into energy in the green plants.

Show clearly how you work out your answer.

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Answer = .....

(2)

- (ii) Suggest reasons why the percentage energy transfer you calculated in part (a)(i) was so low.

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(2)

- (b) Compare the amount of energy transferred to the insect-eating birds with the amount transferred to the predatory birds.

Suggest explanations for the difference in the amount of energy transferred to the two types of bird.

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(3)

(Total 7 marks)



**Q11.**

The diagram shows the flow of energy through a forest. The figures are in kilojoules of energy per square metre per year.



(a) What percentage of the energy in the trees is passed on as food for the carnivores? Show clearly how you work out your final answer.

.....  
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..... per cent

(2)

(b) Give **three** reasons why so little of the energy in the trees is passed on to the carnivores.

1 .....

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3 .....

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