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Centre Number							Candidate Number															
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For Examiner's Use

General Certificate of Education
June 2008
Advanced Level Examination



BIOLOGY (SPECIFICATION B)
Unit 5 The Environment

BYB5/W

Friday 13 June 2008 1.30 pm to 2.45 pm

For this paper you must have:

- a ruler with millimetre measurements.
- You may use a calculator.

Time allowed: 1 hour 15 minutes

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. **Answers written in margins or on blank pages will not be marked.**
- If you need extra space use page 16 for your answers.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The maximum mark for this paper is 66.
- The marks for questions are shown in brackets. One mark will be awarded for Quality of Written Communication.
- You are reminded of the need for good English and clear presentation in your answers.
- Use accurate scientific terminology in all your answers.
- Answers for **Section A** are expected to be short and precise.
- Answer questions in **Section B** in continuous prose where appropriate. Quality of Written Communication will be assessed in these answers.
- You are reminded that this test requires you to use your knowledge of Modules 1-4 as well as Module 5 in answering synoptic questions. These questions are indicated by the letter **S**.

For Examiner's Use			
Question	Mark	Question	Mark
1			
2			
3			
4			
5			
6			
7			
8			
Total (Column 1) →			
Total (Column 2) →			
Quality of Written Communication			
TOTAL			
Examiner's Initials			



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**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



SECTION A

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

1 Students investigated the distribution of plant species on two sides of a valley.

1 (a) Describe how the students would use a frame quadrat for this investigation.

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(4 marks)

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1 (b) The students found that the density of the plant species was lower on the shaded side of the valley than on the side of the valley that was in full sun. Explain this difference.

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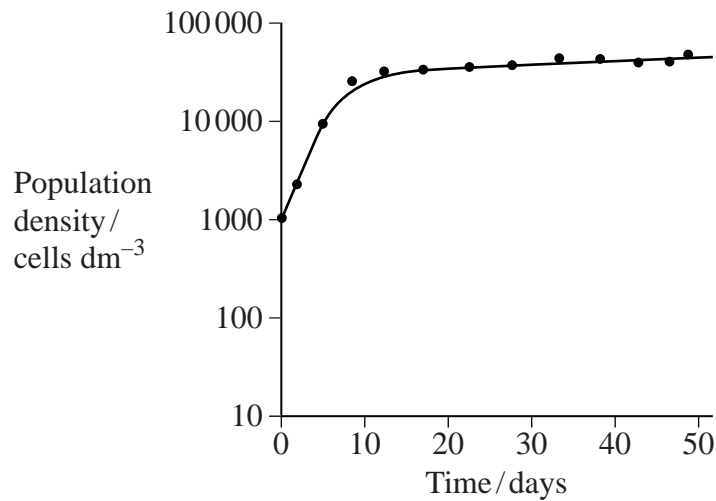
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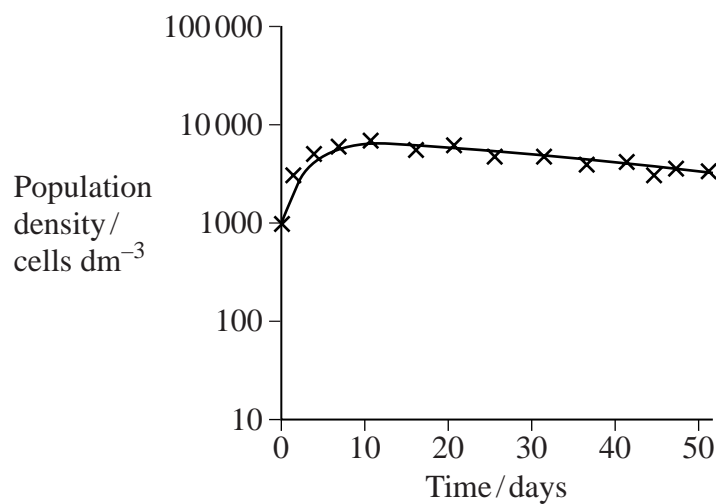
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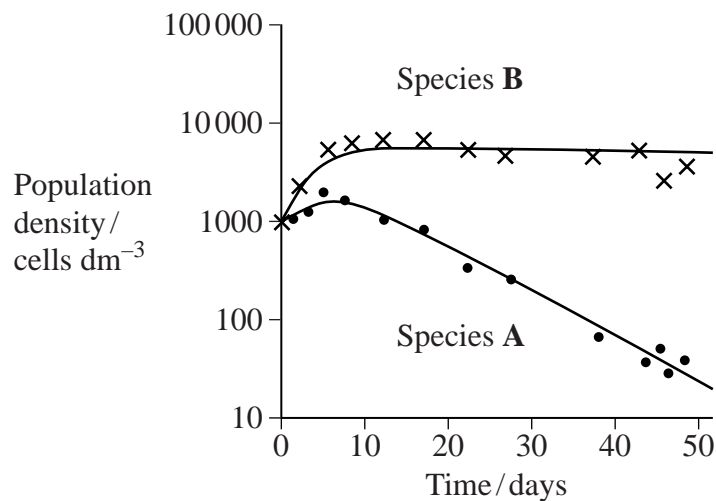
- 2 Species **A** and **B** are unicellular, photosynthesising organisms that are found in the sea. Scientists investigated the population growth of these two species in three tanks of seawater. They grew species **A** on its own in tank 1, species **B** on its own in tank 2 and the two species together in tank 3. The graphs show the results of their investigation.



Tank 1
Species **A**
grown on its own



Tank 2
Species **B**
grown on its own



Tank 3
Species **A** and **B**
grown together



2 (a) Describe and explain the results for tank 1.

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(2 marks)

2 (b) Suggest one explanation for the results for tank 3.

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(2 marks)

Turn over for the next question



- 3** (a) Pesticides can become concentrated in fatty tissues of organisms in the higher trophic levels of food chains. Explain how.

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(3 marks)

(Extra space)

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- S 3** (b) A carboxylase enzyme catalyses the synthesis of fatty acids. One type of pesticide prevents the growth of weeds by inhibiting this enzyme.

- S 3** (b) (i) Explain **one** way in which the pesticide could inhibit the enzyme.

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(2 marks)

- S 3** (b) (ii) Human cells contain a carboxylase enzyme but are not affected by this pesticide. Suggest why.

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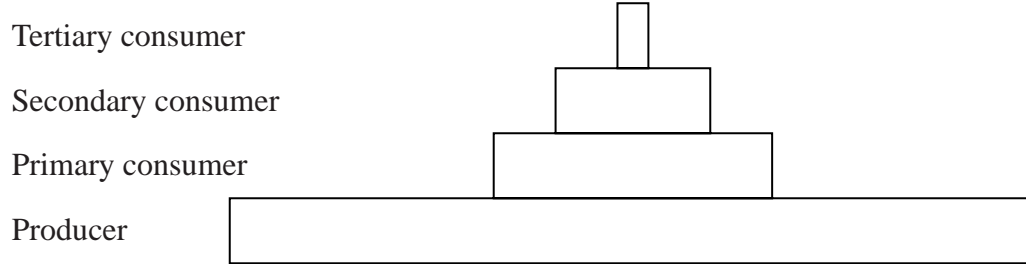
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- 4 The diagram shows a pyramid of energy for an ecosystem.



- 4 (a) Suggest suitable units for a pyramid of energy.

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(2 marks)

- 4 (b) In a plant, some of the energy that falls on the leaves is not used for photosynthesis. Give **one** reason why.

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(1 mark)

- S 4 (c) Some of the energy in producers is used to move mineral ions from cells in the root into the root xylem. Explain how this energy is used.

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(2 marks)

- S 4 (d) In a mammal, heat energy released during respiration may be used to maintain a constant body temperature. Explain the advantage of a constant body temperature to the mammal.

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(2 marks)

- 5 Faeces from cows contain large amounts of dead plant material and are called cow pats.

Students investigated changes in cow pats with time. They recorded the insect species present on cow pats of different ages. The table shows the results.

Insect species	Age of cow pat / days																
	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32
D	✓	✓	✓	✓													
E			✓		✓	✓											
F			✓	✓			✓	✓	✓	✓		✓					
G											✓	✓	✓	✓	✓	✓	
H												✓	✓	✓	✓	✓	✓

Key ✓ indicates insect species is present

- 5 (a) (i) These results illustrate ecological succession. Describe how.

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(Extra space)

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- 5 (a) (ii) Suggest **one** explanation for this ecological succession.

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(2 marks)

(Extra space)

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- 5** (b) Bacteria help to make some of the nitrogen in cow pats available to the grass for growth. Describe how.

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- S 5** (c) The students noticed fungi growing on older cow pats. Fungi are saprophytes. Describe how fungi feed.

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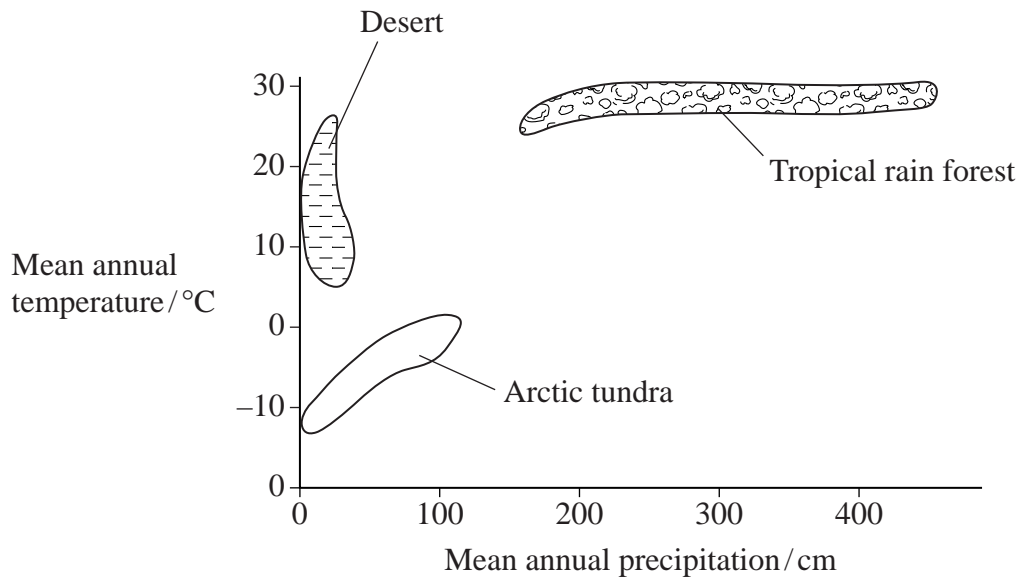
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- 6 The diagram shows the ranges of mean annual temperature and precipitation (water falling as rain or snow) for different types of ecosystems.



- 6 (a) Arctic tundra has fewer niches than tropical rain forest. Use information in the diagram to explain why.

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S 6 (b) Some plants that live in deserts are xerophytes. Explain **three** adaptations that these plants might have which reduce water loss.

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(3 marks)

S 6 (c) Bumblebees are insects that live in the arctic tundra. They have adaptations to keep their body temperature above that of the environment. One adaptation is shivering, which involves rapid muscle contractions. A second adaptation is a very hairy body. Explain how these adaptations help to keep the body temperature above that of the environment.

Shivering

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Hairy body

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(4 marks)

SECTION B

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

Write answers in continuous prose, where appropriate.
Quality of Written Communication will be assessed in these answers.

- 7 A gold mine can produce large amounts of mud containing toxic substances. The mud is kept in large ponds. In hot weather, the ponds dry out and toxic substances can blow on to food crops. Scientists are trying to find treatments using fast-growing plants that will prevent the toxic substances blowing on to food crops. The table shows four treatments that they used and the results they obtained.

Treatment	Type of plant	Phosphate-containing fertiliser added	Mean dry biomass per plant after 90 days / grams		
			Roots	Shoots	Seeds
J	Barley	Yes	3.7	25.2	16.9
K	Barley	No	2.7	5.1	0.2
L	Rye	Yes	35.0	77.3	6.1
M	Rye	No	1.6	0.7	0.0

- 7 (a) Which treatment would be the best one to use to prevent toxic substances blowing on to food crops? Explain your answer.

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- S 7** (b) Barley and rye grow faster when phosphate-containing fertiliser is added. Explain the effects of phosphate-containing fertiliser on the growth of the plants.

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(3 marks)

(Extra space)

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- 7** (c) The phosphate-containing fertilisers may cause environmental damage. Describe how.

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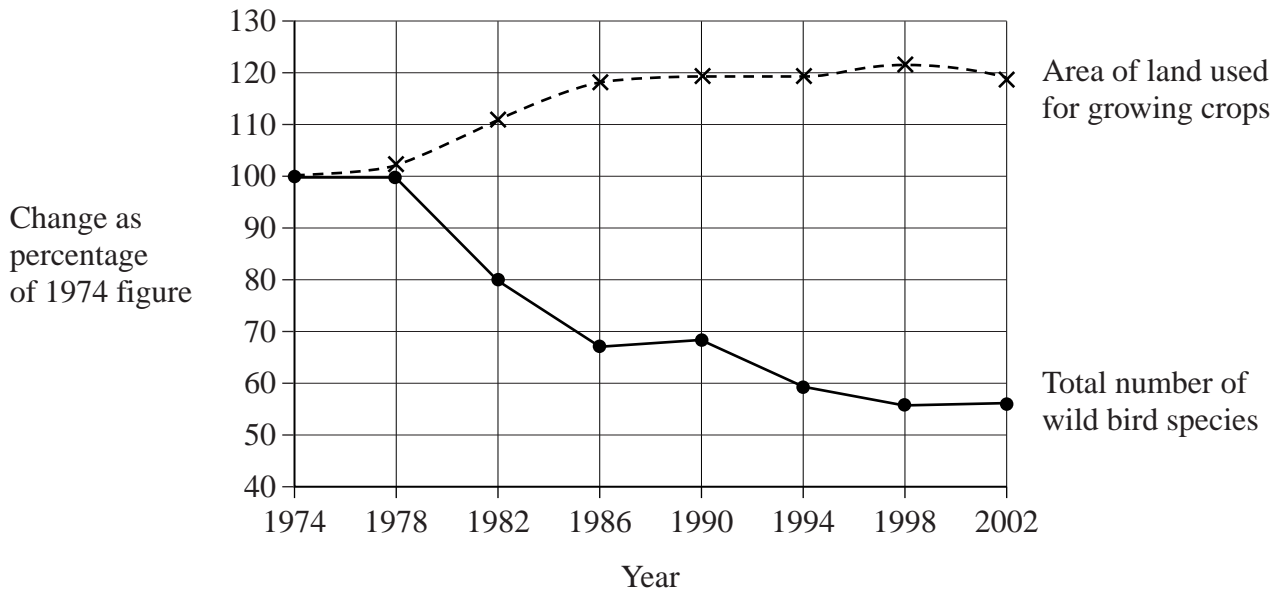
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- 8** Many farmers are now managing their land to balance the need for increased food production and conservation of the environment. Changes in the populations of some bird species are used to monitor changes in the environment. The graph shows the change in the number of wild bird species found on farmland in the UK and in the area of land used for growing crops between 1974 and 2002.



- 8 (a)** Modern farming practices might have been responsible for the changes in the number of wild bird species between 1974 and 2002. Explain how.

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