OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
Advanced GCE

BIOLOGY 2805/03

Environmental Biology

Thursday **30 JANUARY 2003** Afternoon 1 hour 30 minutes

Candidates answer on the question paper.
Additional materials:
Electronic calculator

Candidate Name	Centre Number	Candidate Number

TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces on the question paper.
- Read each question carefully before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You may use an electronic calculator.
- You are advised to show all the stages in any calculations.

FOR EXAMINER'S USE		
Qu.	Max.	Mark
1	15	
2	15	
3	15	
4	15	
5	15	
6	15	
TOTAL	90	

This question paper consists of 15 printed pages and 1 blank page.

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For Examiner's Use

Answer **all** the questions.

1 In 1950, the UK's hedgerows stretched for about 800000 km. However, after years of modern agricultural practices, only half that length remained in the year 2000.

(a) Using the data above, calculate the average length of hedgerow removed per year during the second half of the 20th century. Show your working.

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Answer .....[2]

(b) Outline the reasons why farmers have removed hedgerows.

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(c) Over the centuries, many trees have been destroyed to make way for agriculture. However, on many farms, small areas of woodland still exist, as shown in Fig. 1.1.

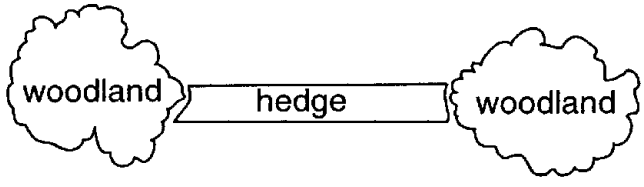

Fig. 1.1

Explain why the existence of a hedgerow in the position shown in Fig. 1.1 is of great importance to wildlife.

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For Examiner's Use

(d) Suggest **three** measures that could be used to halt the disappearance of old hedgerows and encourage the establishment of new ones.

1 .....

2 .....

3 .....[3]

(e) Many species of birds in the UK, such as grey partridges, song thrushes, linnets, bullfinches and corn buntings, have declined in numbers on farmland in recent years.

Outline how changes in agricultural practices, **other than hedgerow removal**, have led to this decline.

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[Total: 15]

[Turn over

For Examiner's Use

2 (a) In this question, one mark is available for the quality of written communication.

Discuss why tropical rain forests are considered to be of enormous global importance.

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Quality of Written Communication [1]

For Examiner's Use

(b) The disappearance of rain forests is a cause of concern.

State **three** reasons why rain forests continue to disappear.

1 .....

2 .....

3 .....[3]

(c) Suggest **four** measures that can be used to reduce the decline of the rain forests.

1 .....

2 .....

3 .....

4 .....[4]

[Total: 15]

[Turn over

For Examiner's Use

3 **(a)** The pH of three soil samples, **A**, **B**, and **C**, was measured. The results are shown in Table 3.1.

Table 3.1

soil sample	pH
A	8.2
B	6.9
C	4.7

(i) Describe the steps taken to measure the pH of a sample of soil.

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(ii) Suggest **one** reason for the difference in pH between soil **A** and soil **C**.

.....[1]

(iii) State **one** reason why soil pH is an important factor for plant growth.

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.....[1]

(b) Explain **two** reasons why it is difficult for many plants to continue to grow when soils become permanently waterlogged.

1 .....

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2 .....

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For Examiner's Use

(c) Soils contain mineral particles of different sizes, such as gravel, sand, silt and clay.

Describe how you would carry out a soil structure analysis to determine the relative proportions of different sized particles.

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(d) Explain why organic matter is an important component of soil.

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[Total: 15]

4 The UK Drinking Water Inspectorate states that water is not taken from sources that are highly polluted and water for drinking is drawn only from good quality surface and ground water. Nevertheless, all water must be treated before it is safe to drink.

Such treatment includes filtration and disinfection.

The Inspectorate also lists the maximum concentrations of many chemicals that are acceptable in drinking water. If these are exceeded, special treatments are required to reduce them. Table 4.1 lists the maximum concentration allowed for four ions.

Table 4.1

ion	maximum concentration allowed /μg dm^{-3}
fluoride	1500
lead	50
phosphate	2200
nitrate	50

(a) Explain the purpose of filtration.

.....[1]

(b) Lead and phosphate are normally found in relatively low concentrations in natural water sources.

(i) Explain why lead and phosphate may sometimes be present in higher concentrations in water used for drinking.

lead .....

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phosphate .....

.....[2]

(ii) Outline the effects of heavy metals, such as lead, on living organisms.

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For Examiner's Use

(c) Although traces of fluoride occur naturally in many water sources, the concentration of fluoride in treated water is often a result of some water companies adding it to the water supply.

Explain why fluoride is added to the water supply.

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.....[1]

(d) Faecal bacteria, such as *Escherichia coli*, are removed from drinking water during disinfection.

(i) State **two** methods that may be used to disinfect drinking water.

1 .....

2 .....[2]

(ii) Suggest how faecal bacteria may come to be present in **untreated** water.

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.....[2]

(iii) State why it is important that there should be no faecal bacteria in treated water.

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.....[1]

(e) Some water companies also have to reduce nitrate concentrations during water treatment.

(i) Explain why nitrate concentrations might be too high in some areas.

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(ii) Suggest why it is necessary to reduce the concentrations of nitrate in drinking water.

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.....[2]

[Total: 15]

[Turn over

For Examiner's Use

5 The agreement at the World Climate Summit in Kyoto (1997), to control global warming by cutting emissions of greenhouse gases, has provoked mixed reactions around the world.

Many governments of industrialised countries have welcomed the Kyoto Treaty. However, environmentalists say that it does not go far enough, while some industrialists fear that it will threaten economic development.

(a) Explain how global warming is thought to be a result of the emission of greenhouse gases.

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(b) List **three** possible consequences of global warming.

1 .....

2 .....

3 .....[3]

(c) In the UK, the increase in levels of three greenhouse gases since 1750 are shown in Fig. 5.1.

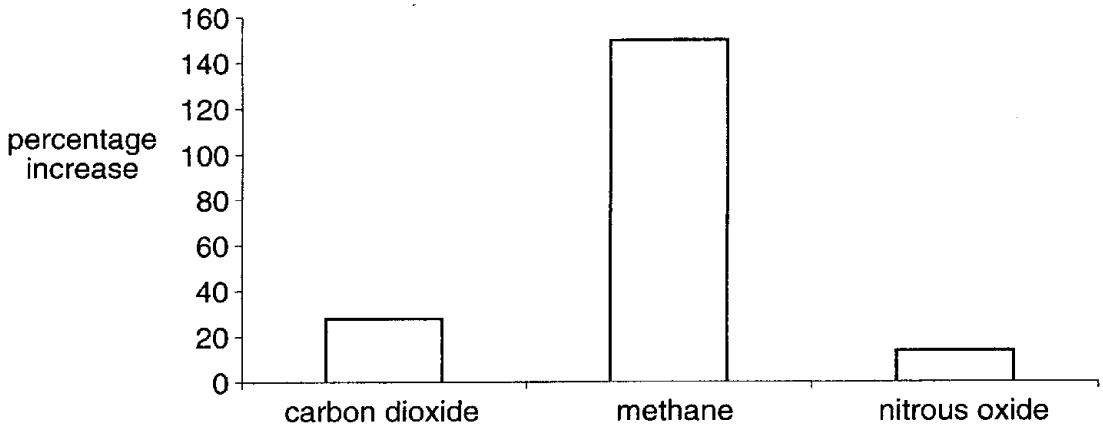

Fig. 5.1

State why the atmospheric levels of these three gases have increased since 1750. *Give a different reason in each case.*

carbon dioxide .....

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methane .....

.....

nitrous oxide .....

.....[3]

(d) Thirty eight nations signed the Kyoto Treaty and agreed to cut their greenhouse emissions by just over 5% by 2012. A number of gases were targeted, including carbon dioxide, methane and nitrous oxide.

Discuss how governments can attempt to meet their targets in reducing these gases.

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[Turn over

(e) Today, many species of plants appear to have fewer stomata than they had in the past. This is thought to be linked to increased levels of atmospheric carbon dioxide.

Suggest an explanation for such a link.

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.....[2]

[Total: 15]

For Examiner's Use

6 **(a)** The government can designate areas of conservation. Such areas include Sites of Special Scientific Interest (SSSIs) and Environmentally Sensitive Areas (ESAs).

(i) State **two** reasons why a particular area might be declared a Site of Special Scientific Interest.

1 .....

2 .....[2]

(ii) Explain what is meant by an Environmentally Sensitive Area.

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.....[2]

The Royal Society for the Protection of Birds (RSPB) works for a healthy environment, rich in birds and other wildlife. It works at local, regional, national and international levels and is the largest wildlife conservation organisation in Europe, with over one million members.
The work of the RSPB requires a considerable amount of income.

(b) State **three** sources of this income.

1 .....

2 .....

3 .....[3]

[QUESTION 6 CONTINUES ON PAGE 14]

[Turn over

For Examiner's Use

(c) In this question, one mark is available for the quality of written communication.

Discuss the range of conservation activities in which the RSPB is involved.

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Quality of Written Communication [1]

[Total: 15]

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