Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						6	1	0	3	/	0	3	Signature	

Paper Reference(s)

6103/03

Edexcel GCE

Biology

Biology (Human)

Advanced Subsidiary

Unit 3 Paper 03

Tuesday 3 June 2008 – Morning

Time: 1 hour

Examiner's use only		

Team Leader's use only		

Question Number	Leave Blank
1	
2	
3	
Total	

Materials required for examination
Ruler

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
The paper reference is shown above. Check that you have the correct question paper.
Answer ALL THREE questions in the spaces provided in this booklet.
Show all the steps in any calculations and state the units. Calculators may be used.
Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for individual questions and parts of questions are shown in round brackets: e.g. **(2)**.
The total mark for this question paper is 38.

Advice to Candidates

You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, taking account of your use of grammar, punctuation and spelling.

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Answer ALL questions in the spaces provided.

1. (a) Give **two** differences between heterotrophic nutrition and autotrophic nutrition.

1 .....

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2 .....

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(2)

(b) Read the following descriptions of heterotrophic organisms and decide which mode of heterotrophic nutrition each uses. Write your answer in the space provided.

(i) This animal lives in freshwater ponds. It feeds by killing other animals, swallowing them and digesting them.

Mode of nutrition .....

(ii) This micro-organism depends on food eaten by an animal. The environment in which it lives is low in oxygen. The micro-organism breaks down carbohydrates and proteins to produce carbon dioxide, methane and volatile fatty acids.

Mode of nutrition .....

(iii) This plant lacks any leaves or roots. Its long, yellow stem twines around other plants. It grows special nutrition-absorbing structures, which enter the other plant and absorb sucrose and water.

Mode of nutrition .....

(iv) This microscopic fungus lives in the soil. Its hyphae spread through the soil and secrete enzymes to digest organic material.

Mode of nutrition .....

(4)

(Total 6 marks)

Q1

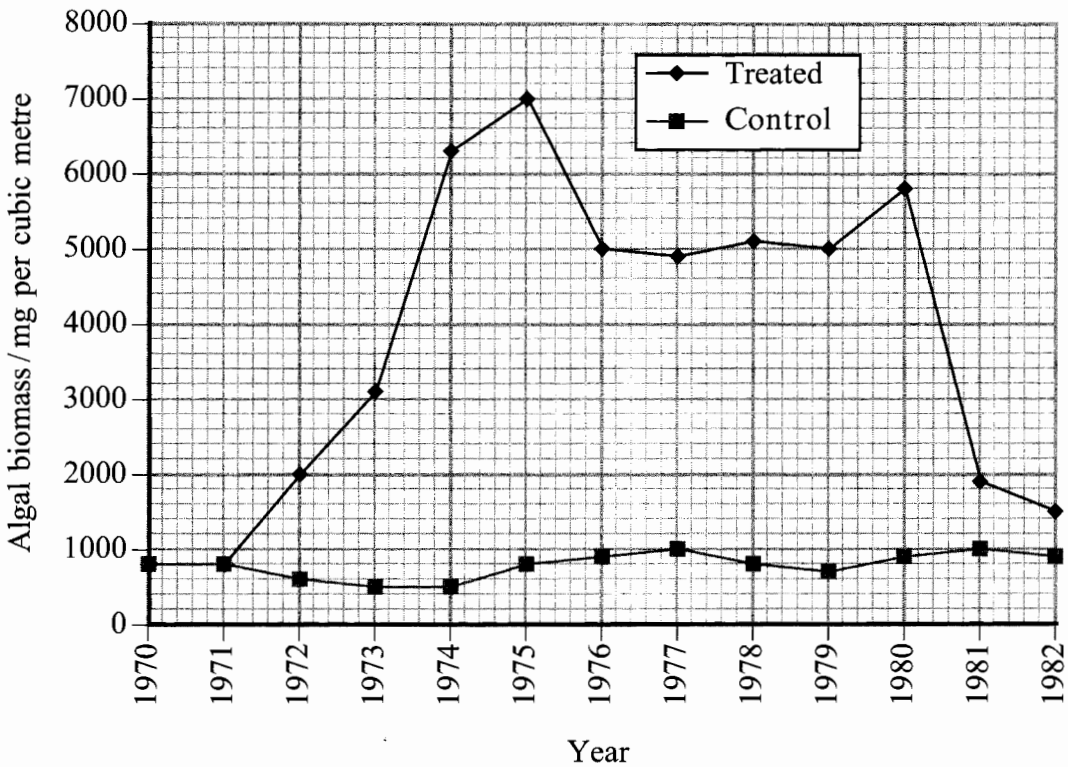
Leave blank

2. In 1970, an investigation took place in Ontario, Canada, in which the whole ecosystem of a lake was altered and the effects monitored. A lake was divided into two sections using a plastic curtain. At the start of the investigation, there was no difference in the biomass of algae in either section of the lake.

One section of the lake was treated by adding extra nitrate to the water each year from 1970 to 1975. No further nitrate was added after 1975. The other section of the lake was the control and did not receive any extra nitrate.

Each year until 1982, the biomass of the algae in the water in both sections of the lake was determined. The results of this investigation are shown below in Figure 1.

Figure 1. The biomass of algae in the treated and control sections of the lake from 1970 to 1982



(a) Define the term **eutrophication**.

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(1)

(b) (i) Using **Figure 1**, calculate the percentage increase in the biomass of algae in the treated section of the lake between 1971 and 1975. Show your working.

Answer .....%

(2)

Leave blank

(ii) Suggest reasons for the changes in algal biomass between 1971 and 1976 in the treated section of the lake.

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(4)

(c) Suggest what effects the treatment could have had on the other organisms living in the water.

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(3)

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(d) (i) Describe how you could estimate the biomass of pondweed growing in a pond.

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(4)

(ii) Explain why it is more useful to estimate the biomass rather than count the numbers of an organism living in a habitat.

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(2)

Q2

(Total 16 marks)

Leave blank

3. Oil is a fossil fuel. It can be used as fuel in power stations and in engines. **Figure 1** below shows oil production between 1960 and 2004.

When oil is burnt, some gases, including carbon dioxide, are released. Some processes by which carbon dioxide is added to, or removed from, the atmosphere are shown in **Figure 2**.

Carbon dioxide is a greenhouse gas, which has an influence upon the mean global temperature of the Earth's surface. Changes in this temperature between 1960 and 2004 are shown in **Figure 3**.

Figure 1. Oil production in thousands of barrels per day between 1960 and 2004

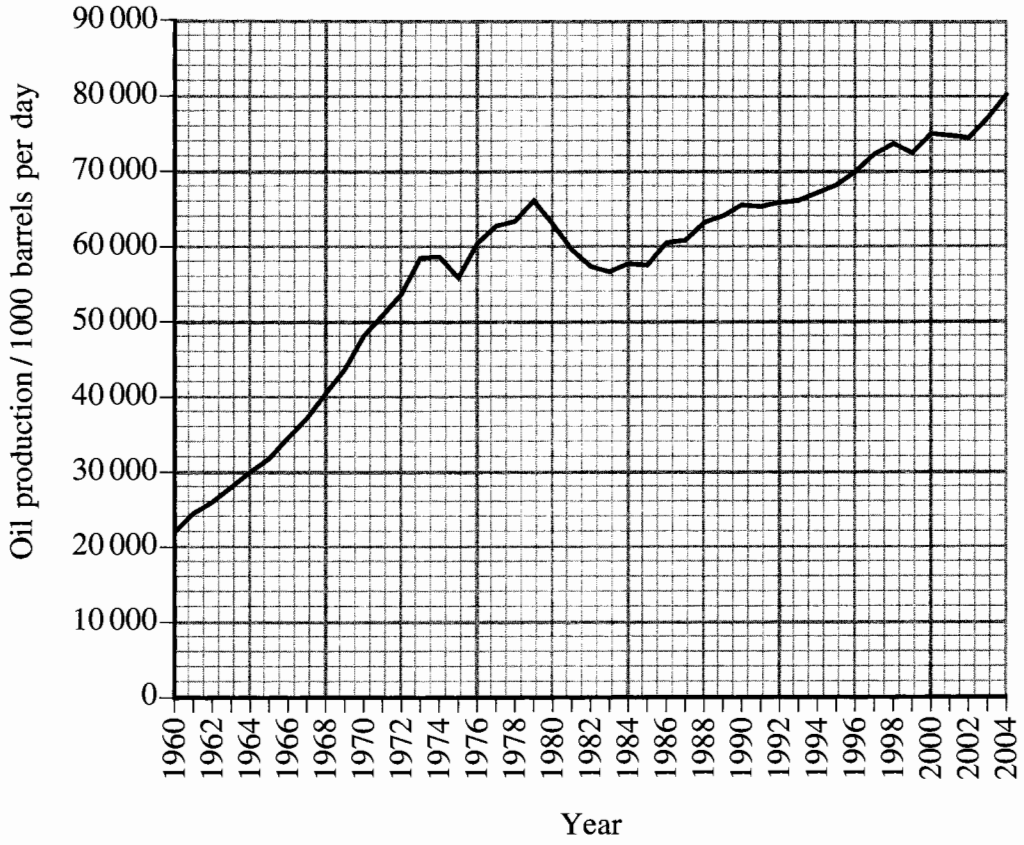

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Figure 2. Diagram showing part of the carbon cycle

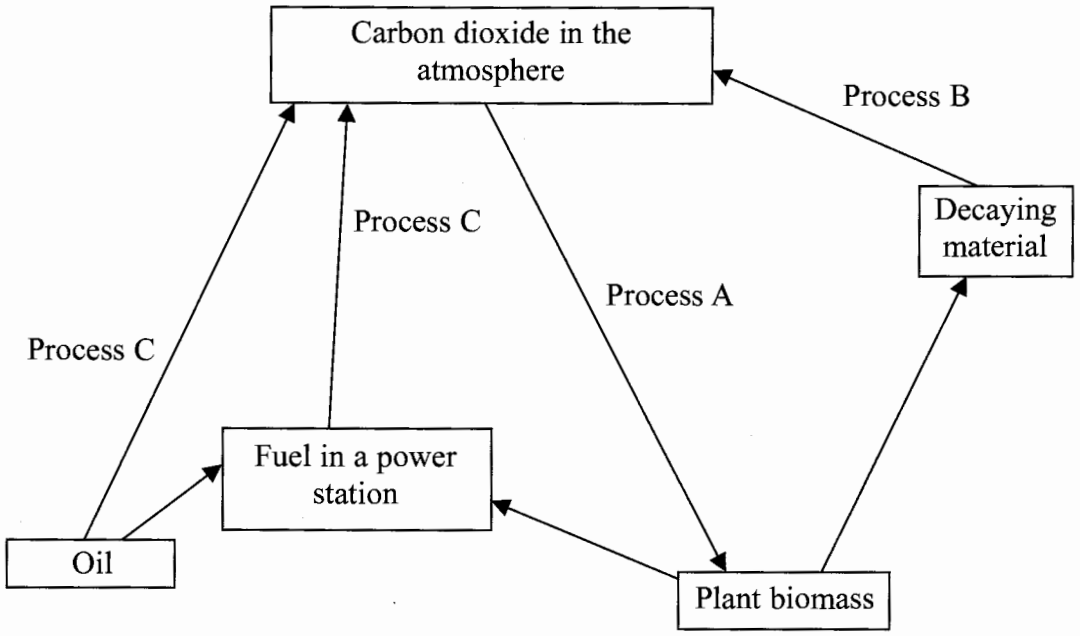
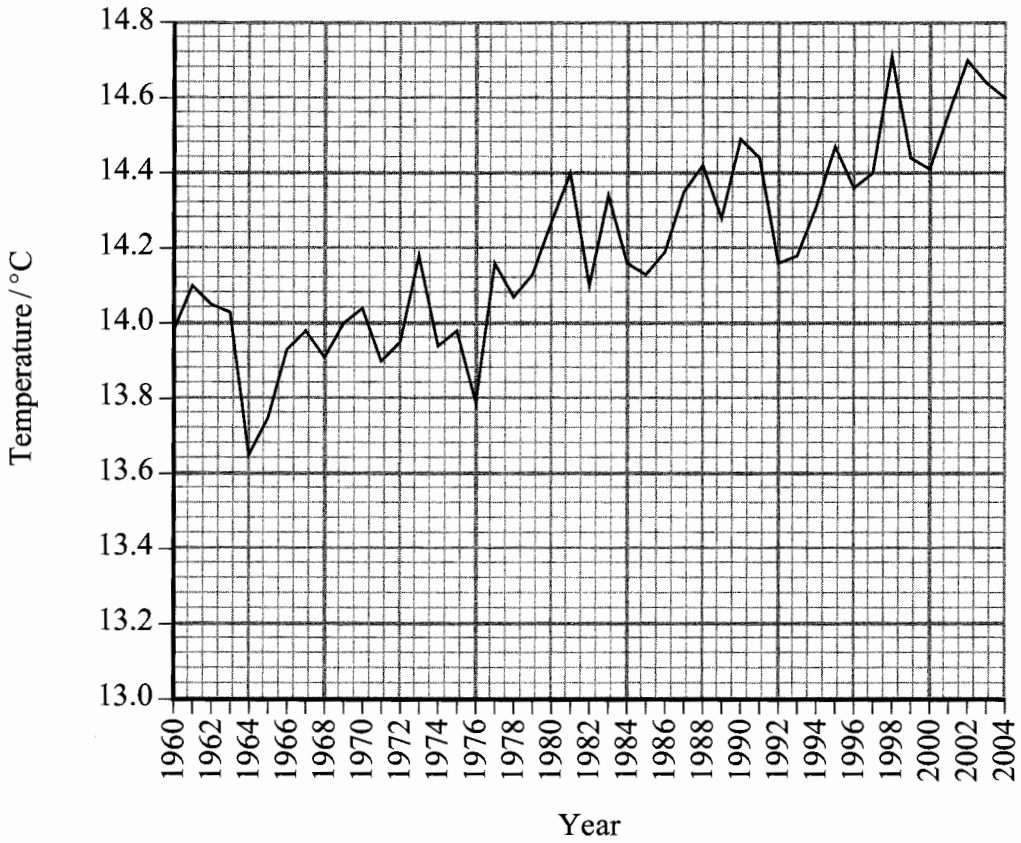


Figure 3. Changes in the mean global temperature of the Earth's surface between 1960 and 2004



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(a) Name the processes A, B and C shown in **Figure 2**.

A .....

B .....

C .....

(3)

(b) Describe the changes in the production of oil between 1960 and 2004 as shown in **Figure 1**.

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(3)

(c) Study the graphs in **Figures 1** and **3**. Do the graphs support the theory that the rise in oil production is linked to the rise in global temperature? Give reasons for your answer.

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(2)

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(d) Carbon dioxide is a greenhouse gas. Explain the term **greenhouse gas** and give an example of another greenhouse gas.

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(2)

(e) Oil is one type of fossil fuel. Give **one** other example of a fossil fuel.

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(1)

(f) Energy crops are plants grown in large plantations to provide a sustainable source of energy. These energy crops, such as fast-growing willow, are likely to become far more common in the future. Explain the term **sustainable**.

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(2)

(g) There is some concern that the replacement of traditional crops, such as wheat, by energy crops could affect the distribution of some birds normally found on farmland.

A study was undertaken to investigate the effect of changing land use on the distribution of bird species. Bird surveys were carried out in four habitats: arable land, grassland, willow plantation on former arable land and willow plantation on former grassland. The numbers of lapwing, snipe and woodcock were recorded by walking through each survey area for one hour three times during one summer. The results of this study are shown in **Figure 4**.

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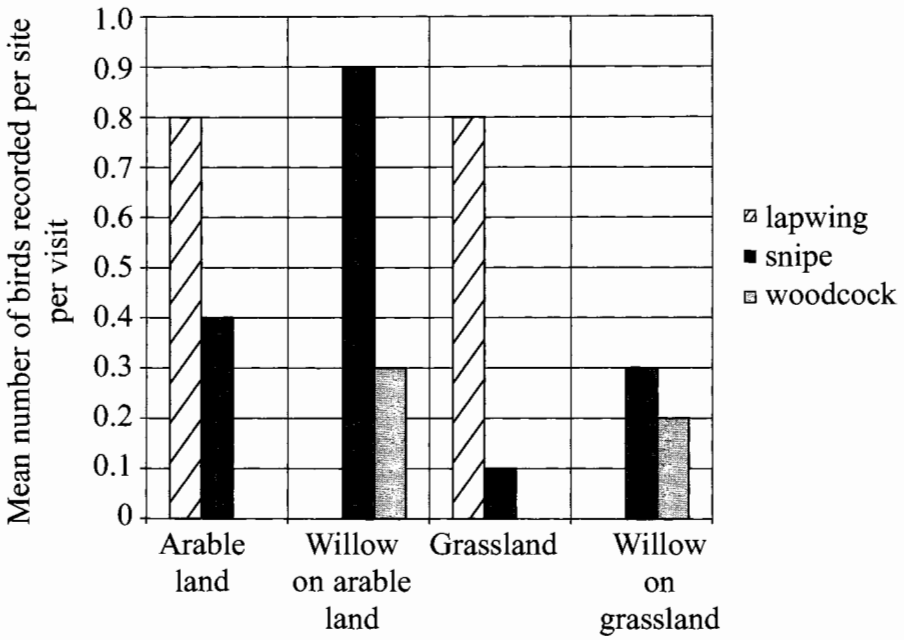
Figure 4. Results of the bird surveys that were carried out on arable land and grassland and in willow plantations growing on former arable and grassland



Use the data in **Figure 4** to describe the effect of planting willow on the distribution of these three species of bird.

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(3) **Q3**

(Total 16 marks)

TOTAL FOR PAPER: 38 MARKS

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