IB DIPLOMA PROGRAMME
PROGRAMME DU DIPLÔME DU BI
PROGRAMA DEL DIPLOMA DEL BI

M04/460/S(2)

ENVIRONMENTAL SYSTEMS
STANDARD LEVEL
PAPER 2

Candidate number

Tuesday 11 May 2004 (afternoon)

1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

- Write your candidate number in the box above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all of Section A in the spaces provided.
- Section B: answer one question from Section B. Write your answers on answer sheets. Write your candidate number on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.
- At the end of the examination, indicate the numbers of the questions answered in the candidate box on your cover sheet and indicate the number of sheets used in the appropriate box on your cover sheet.

SECTION A

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

1. (a) Define the term *ecosystem*. *[2]*

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(b) Define the term *biome*. *[2]*

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(This question continues on the following page)

(Question 1 continued)

The photograph below shows a particular ecosystem.

[Source: www.beaglesunlimited.com]

(c) State and briefly describe the ecosystem shown in the photograph. *[3]*

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(d) (i) State whether you would expect ecosystems of the type shown in the photograph to have a low, medium or high level of primary productivity. *[1]*

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(ii) State **two** factors that limit the primary productivity of such ecosystems. *[2]*

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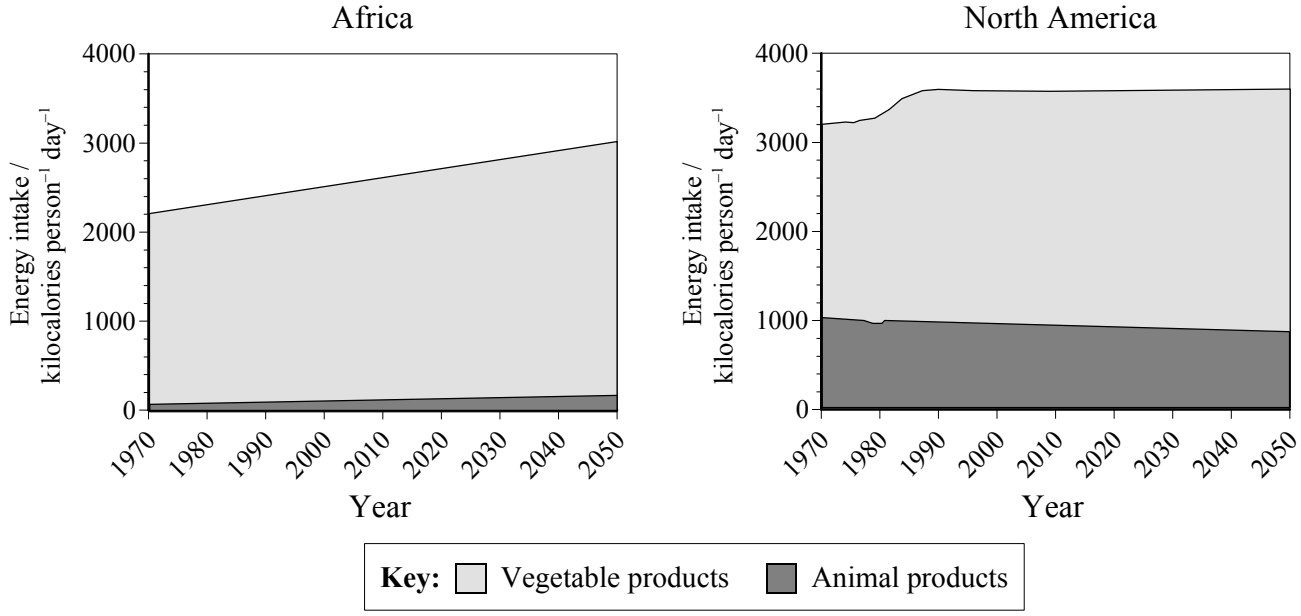
2. The graphs below show recent and projected trends in dietary energy intake from plant and animal products, for the populations of Africa and North America.



[Source: UNEP/Global Resource Information Database (GRID), Arendal, Norway – www.grida.no/geo1/fig/fig4_11]

(a) Compare the data for Africa and North America shown in the above graphs. *[4]*

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(b) Suggest **one** possible reason for **one** difference between the two graphs. *[1]*

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3. (a) List **three** greenhouse gases. *[1]*

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(b) Outline **one** way in which human activities are changing the proportion of one of these greenhouse gases in the atmosphere. *[1]*

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(c) State **two** possible effects of the changes in the total proportion of greenhouse gases in the atmosphere. *[2]*

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4. (a) Explain what is meant by the term *climax community*. *[2]*

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(b) Outline how the species composition changes during succession using specific examples, from a **named** habitat. *[3]*

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(c) Describe how the changes in species composition might affect a **named** abiotic factor in the habitat stated in (b) above. *[2]*

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5. (a) Define the term *feedback*. *[1]*

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(b) Explain, with the help of an example, the term *negative feedback* in relation to an ecosystem. *[3]*

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SECTION B

*Answer **one** question. Write your answers on the answer sheets provided. Write your candidate number on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.*

Each essay question is marked out of a total of 20 marks of which 3 are allocated to the expression and development of ideas as follows:

0 No expression of relevant ideas.
1 Expression and development of relevant ideas is limited.
2 Ideas are relevant, satisfactorily expressed and reasonably well developed.
3 Ideas are relevant, very well expressed and well developed.

6. (a) With the help of examples, distinguish between a *food chain* and a *food web*. *[5]*

(b) Explain, with the help of a diagram, how the flow of energy along a food-chain illustrates the first law of thermodynamics. *[8]*

(c) Explain how the extinction of **one** species in an ecosystem can have an influence on the abundance of many other species. *[4]*

Expression of ideas *[3]*

7. (a) Explain why the precipitation in some parts of the world is acidic. *[6]*

(b) Describe the effects of acid precipitation on the environment. *[5]*

(c) Describe what can be done to reduce acid precipitation and its effects. *[6]*

Expression of ideas *[3]*

8. (a) Explain, with the help of examples, what is meant by each of the terms *renewable*, *replenishable* and *non-renewable natural capital*. *[6]*

(b) Explain how you would determine whether or not a **named** renewable resource was being managed sustainably. *[5]*

(c) Describe, with the help of examples, some of the difficulties in measuring the value of natural capital. *[6]*

Expression of ideas *[3]*