



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
 General Certificate of Education  
 Advanced Subsidiary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER



**ENVIRONMENTAL MANAGEMENT**

**8291/21**

Paper 2 Hydrosphere and Biosphere

**May/June 2010**

**1 hour 30 minutes**

Additional Materials: Answer Booklet/Paper

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.  
 Write in dark blue or black pen.  
 You may use a soft pencil for any diagrams, graphs, tables or rough working.  
 Do not use staples, paper clips, highlighters, glue or correction fluid.  
 DO **NOT** WRITE IN ANY BARCODES.

**Section A**

Answer **all** questions.  
 Write your answers in the spaces provided on the question paper.

**Section B**

Answer **one** question from this section.  
 Answer the question on the separate answer paper provided.

At the end of the examination,

1. fasten all separate answer paper securely to the question paper;
2. enter the question number from Section B in the grid opposite.

For Examiner's Use	
<b>Section A</b>	/
<b>1</b>	
<b>2</b>	
<b>Section B</b>	/
<b>Total</b>	

This document consists of **11** printed pages and **1** blank page.



Section A

Answer **all** questions in this section.

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Examiner's  
Use

- 1 (a) Fig. 1.1 is a model depicting how a plant succession might be affected by human disturbance.

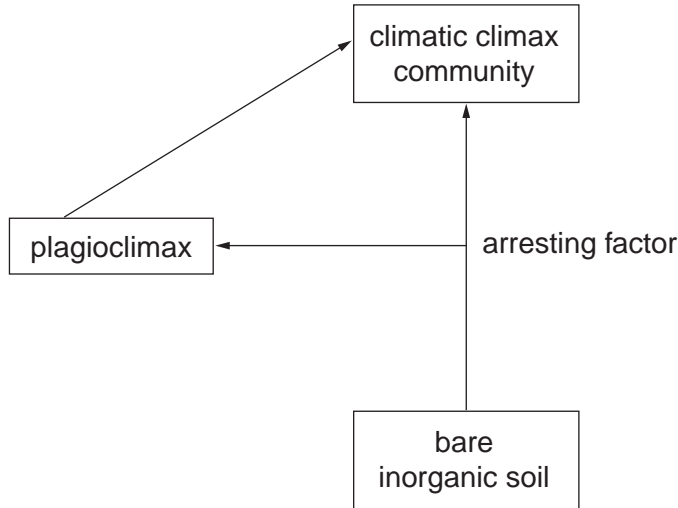


Fig. 1.1

- (i) Define the terms *plant succession* and *climatic climax community*.

plant succession .....

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.....

.....[2]

climatic climax community .....

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.....[2]

- (ii) Explain how human activities would, in time, produce a plagioclimax plant community.

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.....[2]

(b) Describe and explain **two** different effects deforestation might have on the area shown in Fig. 1.2.

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Use



Fig. 1.2

effect 1 .....

.....

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.....[2]

effect 2 .....

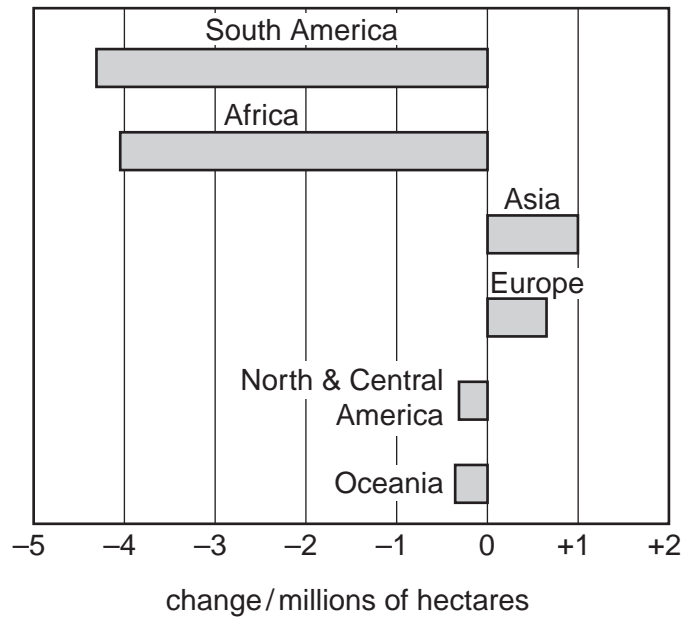
.....

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.....[2]

(c) Fig. 1.3 shows losses and gains of forested land for continental areas in the period 2000 to 2005.

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Use



**Fig. 1.3**

(i) Compare the change in forested land for the continental areas shown in Fig. 1.3.

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..... [3]

(ii) Outline **one** ecological reason for the change in forest cover in Europe.

.....

..... [1]

(iii) Outline **one** economic reason for the change in forest cover in South America.

.....

..... [1]

(d) *Silviculture is “the art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis”. (Dictionary of Forestry 1998)*

Fig. 1.4 shows **two** methods of managing forests in a sustainable way.

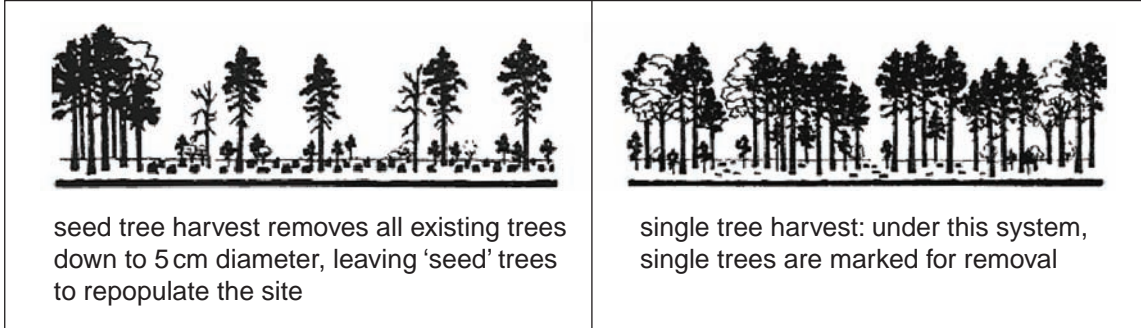


Fig. 1.4

(i) Select **one** method from Fig. 1.4 and justify why it can achieve a sustainable management of forest.

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.....[4]

(ii) Give **one** reason why you rejected the other method shown in Fig. 1.4.

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.....[1]

[Total: 20]



2 (a) Rivers can become polluted with a variety of substances derived from many different sources.

(i) Complete Table 2.1 by matching the following list of pollutants with the correct source. Use each pollutant **once** only. [5]

detergents      hydrocarbons      sand      nitrates      litter

**Table 2.1**

source of pollution	pollutant
agriculture	
quarrying	
shopping centres	
domestic pollution from dwellings	
roads	

(ii) Explain why some of these sources can lead to storm water pollution.

.....  
 .....  
 .....  
 ..... [2]

(b) A pipe carrying pollution into a river had an adverse effect on the ecology of the river close to the pipe outlet as well as downstream. Research into the pollution of the river from the pipe produced the results shown in Table 2.2. The river was being polluted from the pipe at the time the research was undertaken.

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Use

Table 2.2

site	BOD/mg l <sup>-1</sup>		pH		suspended solids/ mg l <sup>-1</sup>	
	level	legal limit	level	legal limit	level	legal limit
<b>A</b> 5 m upstream of pipe	0.2	≤5	8.3	6 – 9	<10	≤25
<b>B</b> pool directly beneath the pipe	52.5	n/a	10.25	n/a	25	n/a
<b>C</b> 120 m downstream from the pipe	6.8	≤5	10.05	6 – 9	37	≤25

BOD = biological oxygen demand in milligrams of oxygen per litre of river water  
n/a = limits not applicable to actual discharge, only the receiving water  
pH = a measurement of acidity: 7 is neutral, <7 is acid, >7 is alkaline

(i) Describe the biological, chemical and physical qualities of the river water at site **A**.

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.....[3]





## Section B

Choose **one** question from this section.

- 3 (a) Fig. 3.1 shows worldwide trends in the populations of terrestrial, freshwater, and marine species. The value of 100 for 1970 is used as a benchmark index.

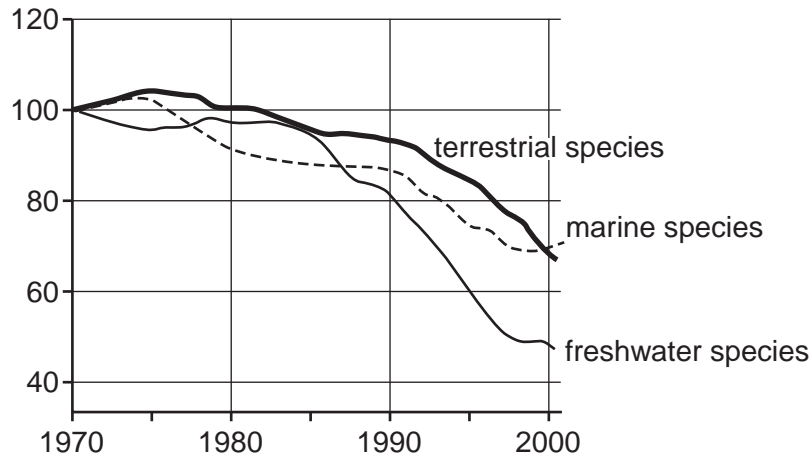


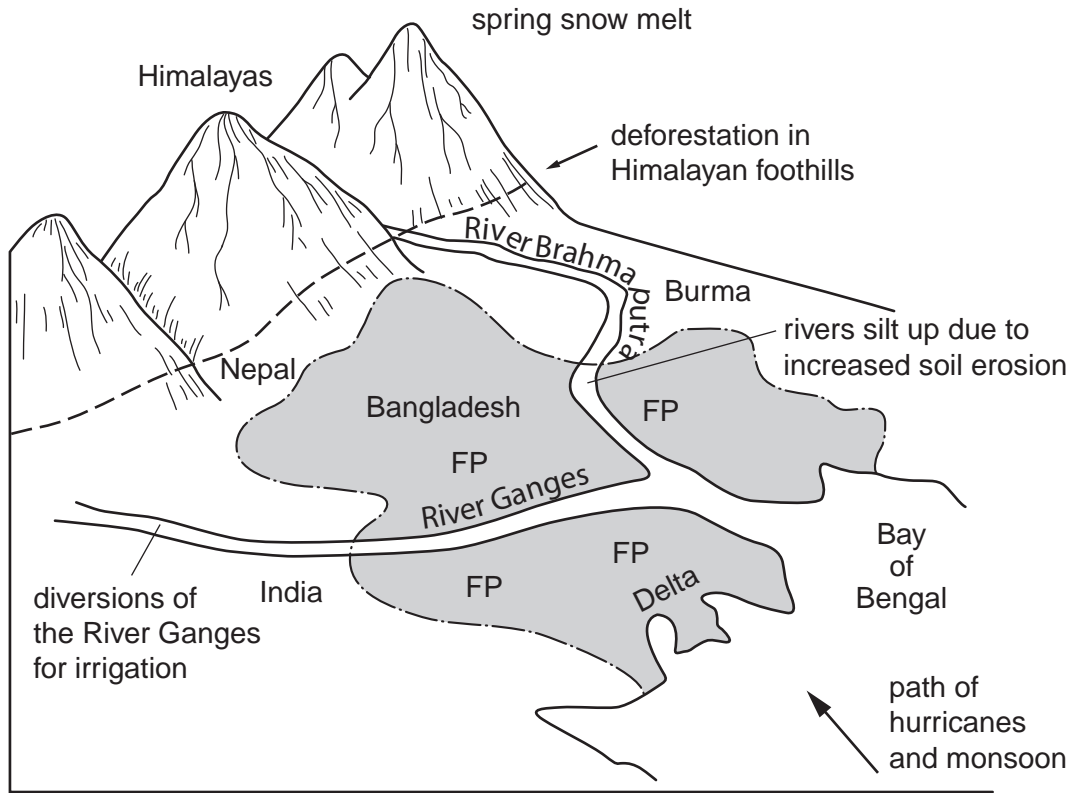
Fig. 3.1

Describe the trends shown in Fig. 3.1 and suggest a reason for each of these trends. [10]

- (b) With reference to examples you have studied, describe and assess **two** strategies that are used to conserve species and maintain biodiversity. [30]

[Total: 40]

- 4 (a) Use Fig. 4.1 to explain how the natural environment and human activity combine to produce the annual extreme flooding experienced in Bangladesh. [10]



**Key**

- FP Flood Plain
- ~~~~~ rivers
- - - - Bangladesh National boundary

**Fig. 4.1**

- (b) Strategies for managing rivers serve a number of purposes. Using examples, assess the measures that are undertaken to maintain a sustainable supply of water as well as to control flooding. [30]

[Total: 40]

- 5 (a) Explain how the over-exploitation of whales and krill from the oceans surrounding Antarctica might affect the marine food web shown in Fig. 5.1. [10]

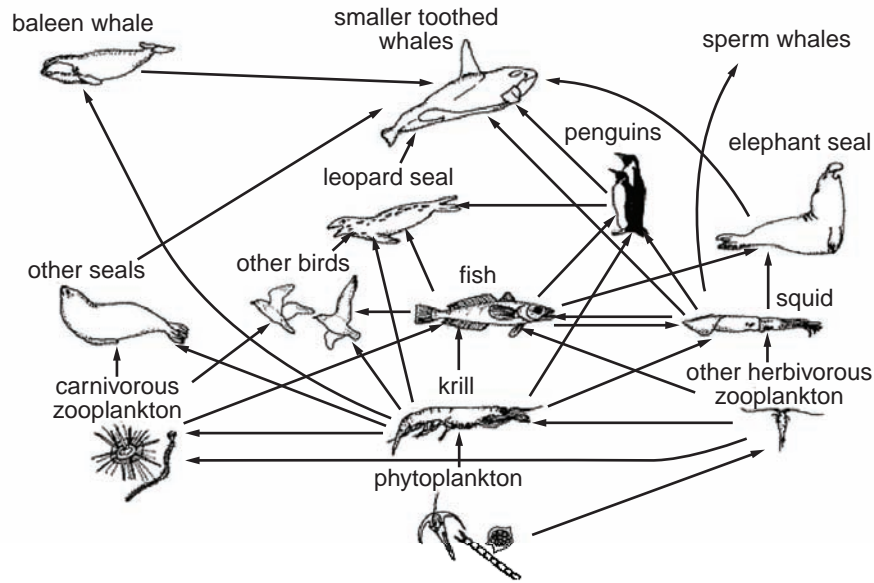


Fig. 5.1

- (b) Assess the roles of pressure groups and governments in the conservation of endangered marine species. [30]

[Total: 40]

*Copyright Acknowledgements:*

- Question 1 Figure 1.2 © Deforested Slope; Cameroon Wildlife Aid Fund.  
 Question 1 Figure 1.4 © John A Helms, Dictionary of Forestry; The Society of American Foresters, 1998.  
 Question 3 Figure 3.1 © World Wildlife Fund for Nature.  
 Question 4 © Himalayas/Bangladesh (adapted); cgz.e2bn.net/e2bn/teas/c99/schools/cgz/account.  
 Question 5 © www.coolantarctica.com/Antarcticafactfile.wildlife/foodweb.gif.

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