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

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

0981078476

ENVIRONMENTAL MANAGEMENT **8291/02**

Paper 2 Hydrosphere and Biosphere **October/November 2007**

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, table or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE ON 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.

All questions in this paper carry equal marks.

For Examiner's Use	
Section A	
1	
2	
Section B	
Total	

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

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 **(a)** Fig. 1.1 shows the under-storey (sub-canopy) vegetation in an area of tropical rain forest.

Fig. 1.1

(i) Fig. 1.2 is an incomplete pictorial graph for showing the structure of a tropical rain forest. Add to the graph two additional, labelled vegetation layers. [2]

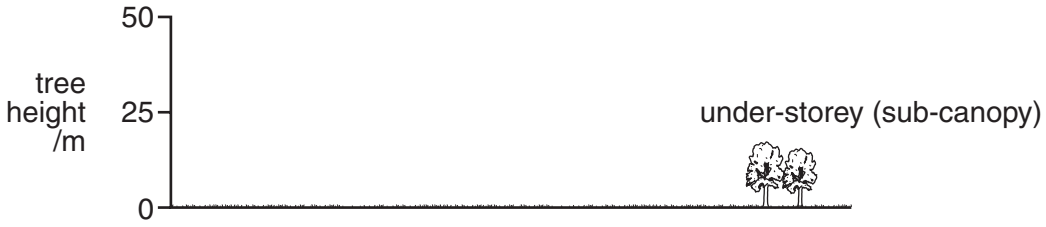

Fig. 1.2

(ii) Identify **three** different ecosystems that are shown in Fig. 1.1

1 .....

2 .....

3 .....[3]

(iii) Describe the biotic and abiotic factors that would sustain **one** of the ecosystems you have identified in **(ii)**.

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.....[4]

(b) Fig. 1.3 shows the stores and flows of nutrients within a tropical rain forest. In this diagram the sizes of the circles and widths of the arrows are proportional to the quantities of nutrients.

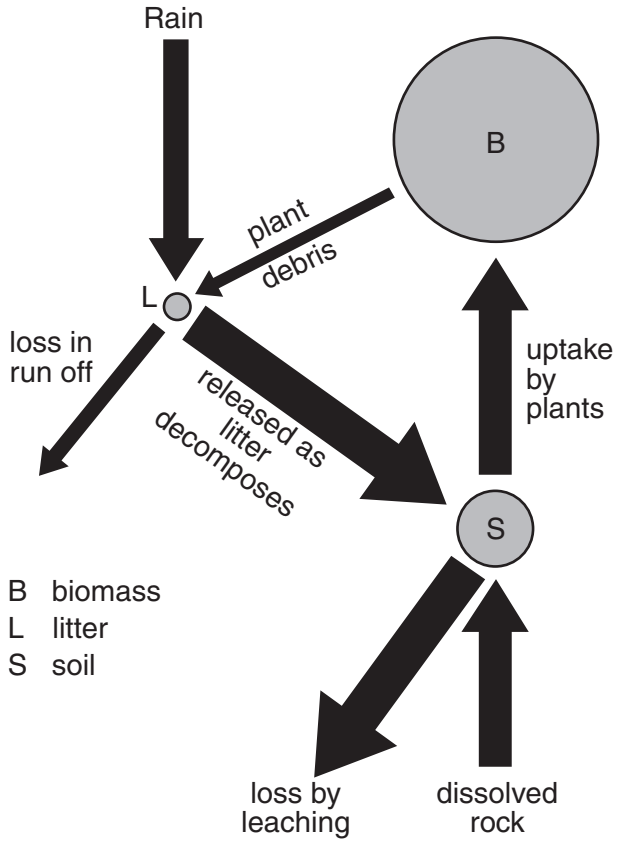

Fig. 1.3

(i) Name the largest store of nutrients shown in Fig. 1.3.

.....[1]

(ii) Between which two stores is the largest flow of nutrients?

.....[1]

(iii) Use Fig. 1.3 to suggest reasons for the very poor quality soils frequently found in areas of tropical rain forest.

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.....[3]

(c) The model in Fig. 1.4 represents one planning measure used to conserve areas of woodland threatened by human activity.

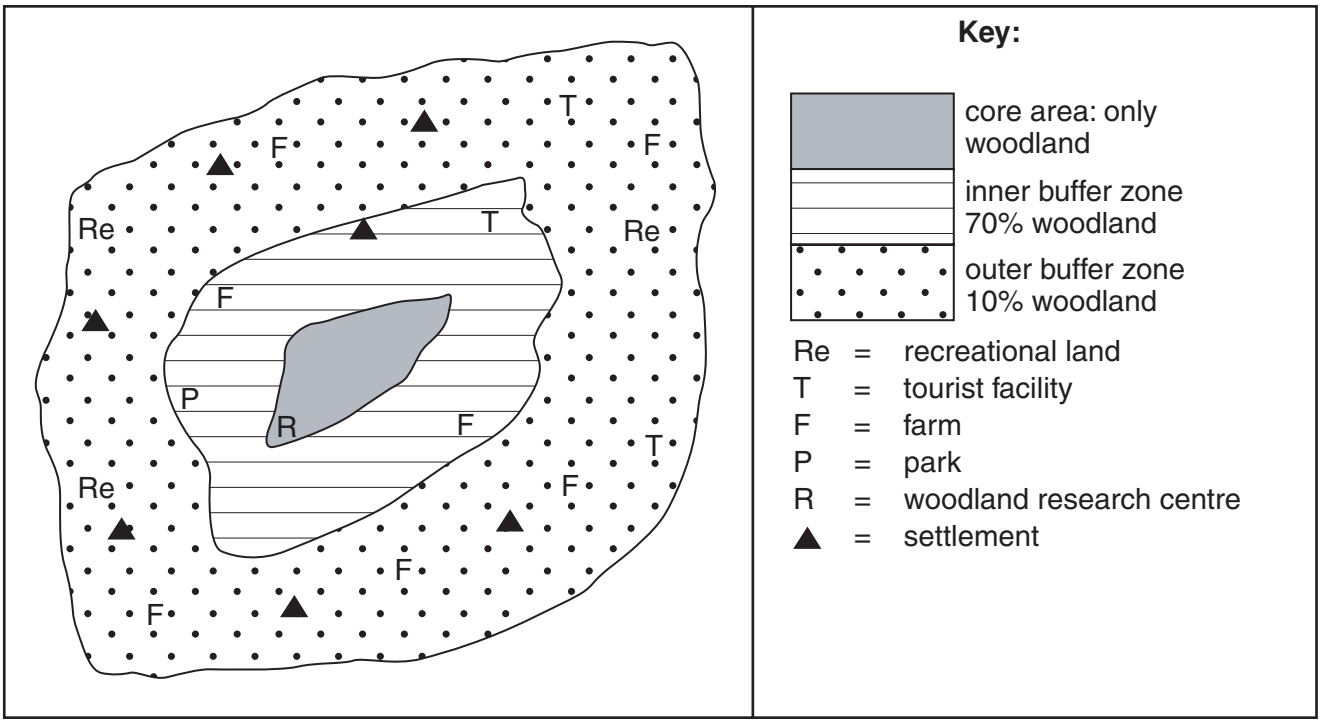

Fig. 1.4

(i) What is the significance of the core area in the model?

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.....[1]

(ii) Explain how such a strategy could successfully conserve an area of woodland that is threatened by human activity.

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.....[5]

[20 marks]

2 **(a)** Fig. 2.1 shows the estimated residence times of the world's stores of water. (residence time is the average time that a unit of water is retained in a store)

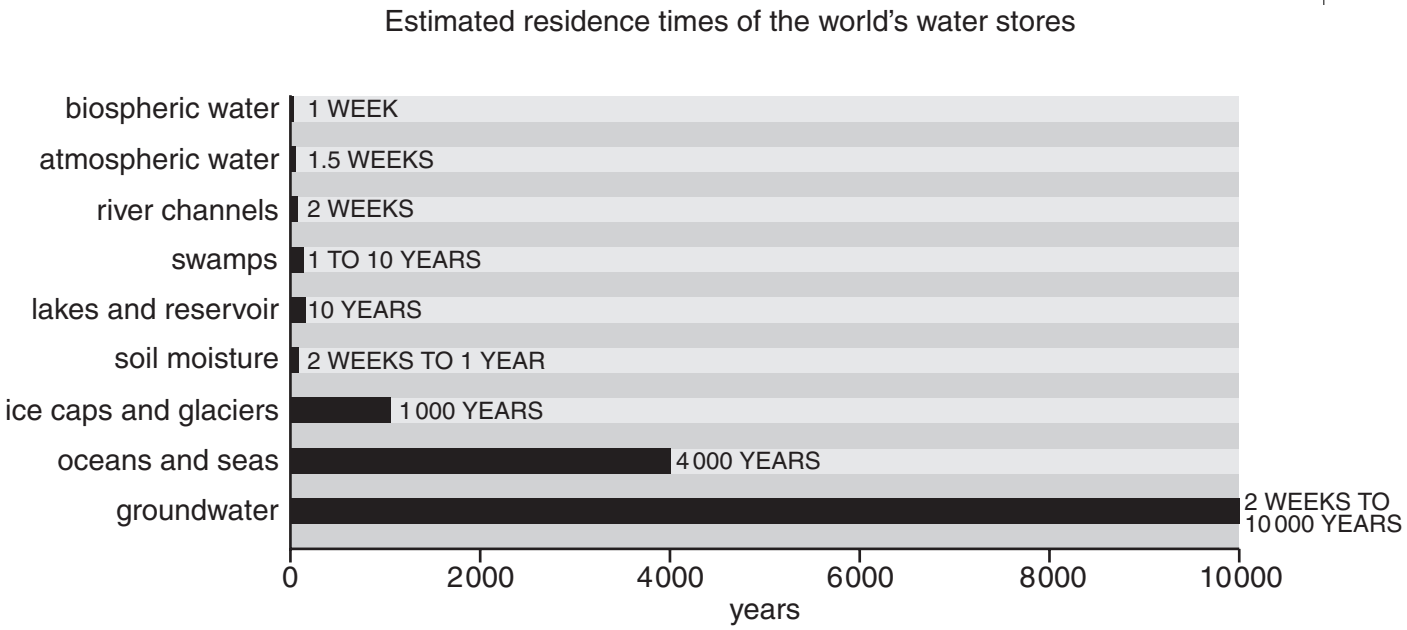

Fig. 2.1

(i) Suggest why it can be helpful to show water resources in the form of residence times rather than by volume.

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.....[2]

(ii) Suggest why biospheric and atmospheric water have very short residence times.

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.....[2]

(iii) From evidence provided in Fig. 2.1, explain why it is often important to construct reservoirs.

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.....[2]

(iv) Explain why the residence period for soil moisture is given as a range of 2 weeks to 1 year, and groundwater 2 weeks to 10 000 years.

soil moisture

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.....[2]

groundwater

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.....[2]

(b) Fig. 2.2 illustrates some of the major causes and forms of groundwater pollution.

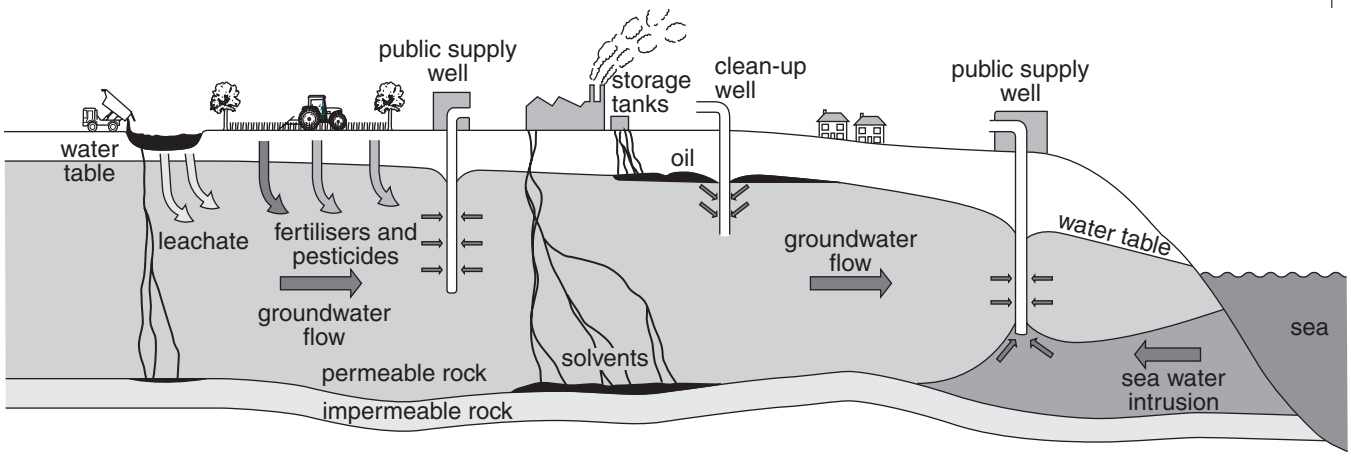

Fig. 2.2

(i) Name **one** type of groundwater pollution that is derived from

agricultural activity,

.....

industrial activity.

.....[2]

(ii) Describe how the extraction of water from a public well supply can affect the water table and increase groundwater pollution.

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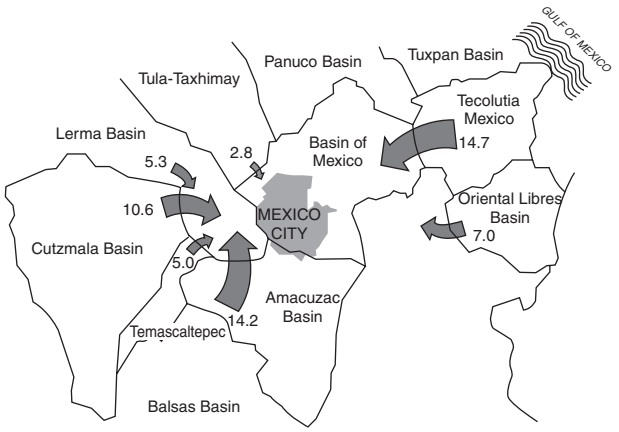
.....[2]

For Examiner's Use

(c) Mexico City has been one of the world's fastest growing cities. Its population exceeds 20 million. As the climate is dry, water resources for domestic, industrial and agricultural use are under great strain. Fig. 2.3 summarises the water supply strategy for Mexico City.



Raw Water	Federal District	State of Mexico	Total
Basin of Mexico well fields	22.7	20.3	43.0
Magdalena River	0.2	–	0.2
Madin Dam	–	0.5	0.5
Springs, streams	0.5	0.2	0.7
imported sources			
Cutzamala River	7.6	3.0	10.6
Lerma well fields	4.3	1.0	5.3
total water supply	35.3	25.0	60.3

Fig. 2.3

(i) Describe how Mexico City is attempting to meet its demands for water.

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.....[4]

(ii) Outline two issues that may arise in maintaining a clean supply of water for Mexico City.

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.....[2]

[20 marks]

Section B

Answer **one** question from this section.

Answers must be in continuous prose.

Write your answers on the separate paper provided.

3 **(a)** Describe the functioning of the coral reef ecosystem shown in Fig. 3.1. [10]

Coral Reef Food Web

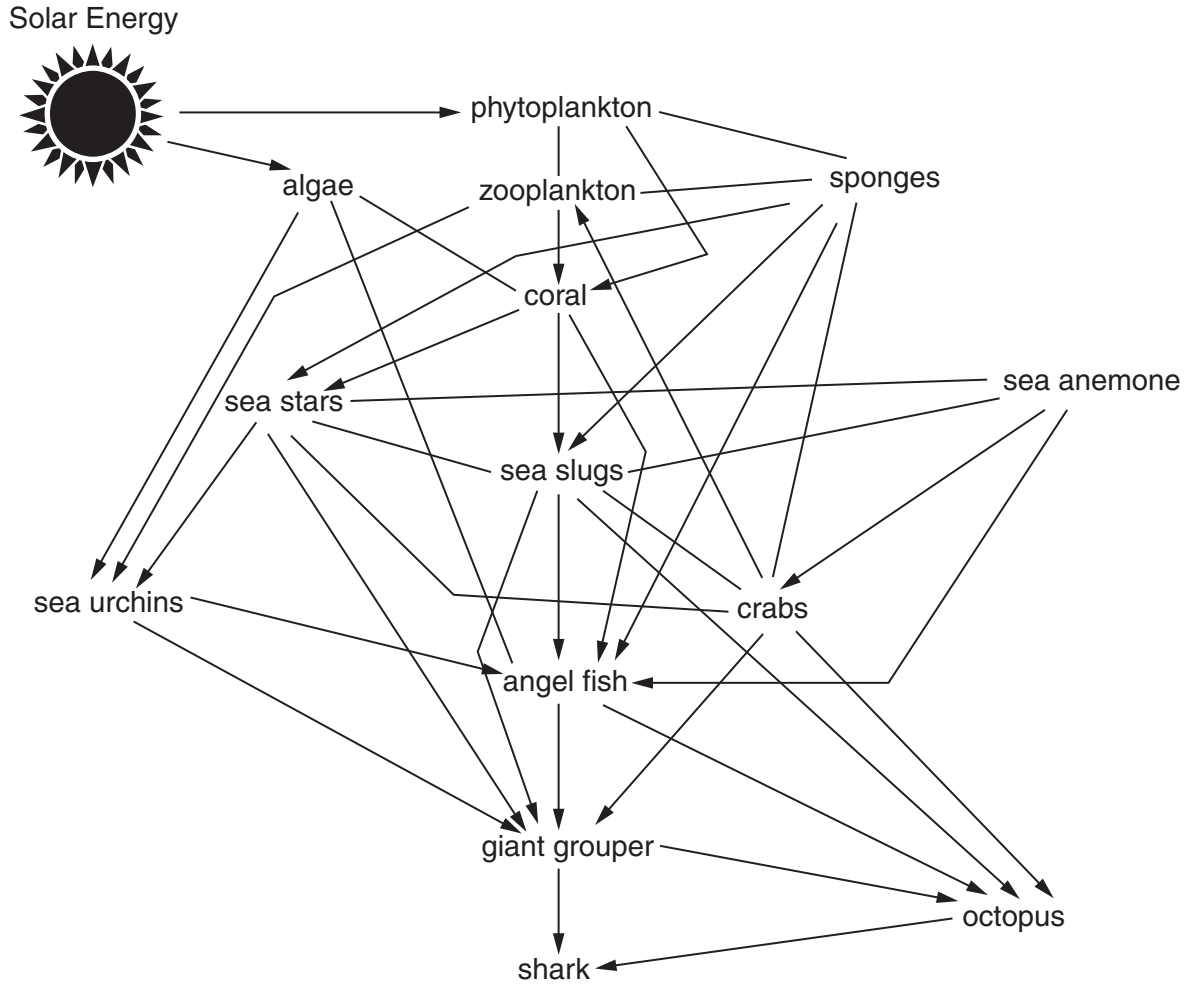

Fig. 3.1

(b) Giving examples, explain how and why some marine ecosystems are under threat from human activity. Assess the extent to which the management of human activity has helped the conservation of one named marine ecosystem. [30]

[40 marks]

4 **(a)** Fig. 4.1 shows how the three conditions of under-population, optimum population and overpopulation can be related to population size and the wealth of a nation.

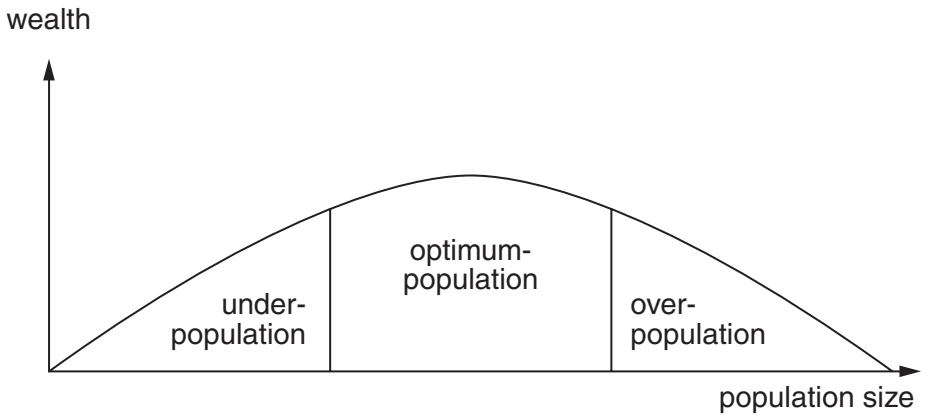

Fig. 4.1

In terms of the extent to which nations utilise their resources, use Fig.4.1 to explain the terms *under-population*, *optimum population* and *over-population*. [10]

(b) Using examples from Less Economically Developed Countries (LEDCs) and More Economically Developed Countries (MEDCs), assess the extent to which a sustainable future is dependent upon managing population change. [30]

[40 marks]

5 **(a)** What is meant by the term *eutrophication?* Describe the causes and effects of eutrophication in lakes. [10]

(b) Outline the main types and causes of pollution in a river with which you are familiar. Describe and evaluate the measures that have been used to reduce pollution in this river. [30]

[40 marks]

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