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**8291/02**

October/November 2007

**1 hour 30 minutes**

Additional Materials: Answer Booklet/Paper

\* 0981078476 \*

Write in dark blue or black pen.

Do not use staples, paper clips, highlighters, glue or correction fluid.

DO **NOT** WRITE ON ANY BARCODES.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

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 |  |
|--------------------|--|
| <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.

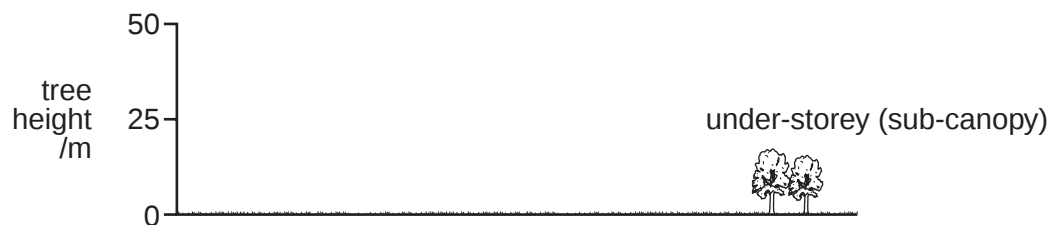
Write your answers in the spaces provided.

- 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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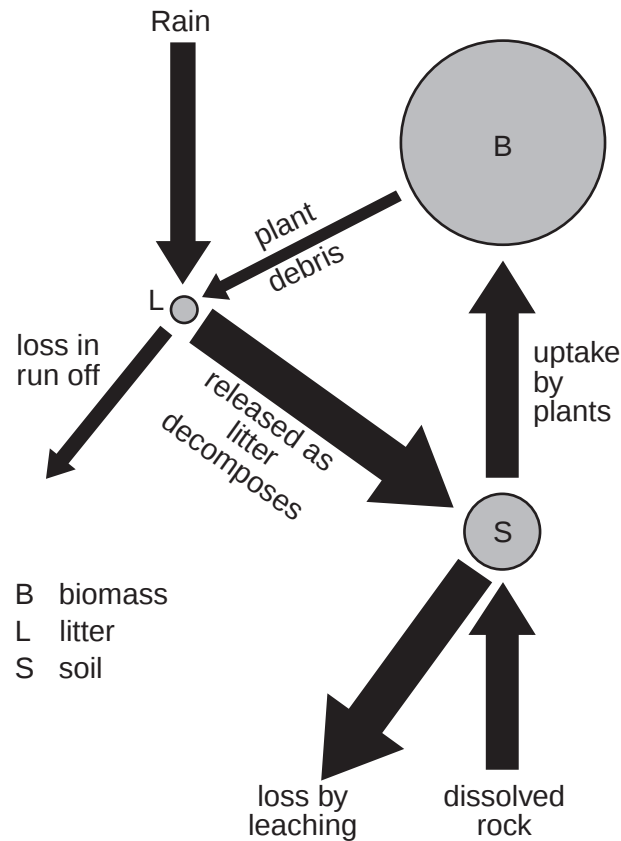
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.....[4]

- (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.  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....[3]

- 
- Key:**
- core area: only woodland
  - inner buffer zone 70% woodland
  - outer buffer zone 10% woodland
  - Re = recreational land
  - T = tourist facility
  - F = farm
  - P = park
  - R = woodland research centre
  - ▲ = settlement

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

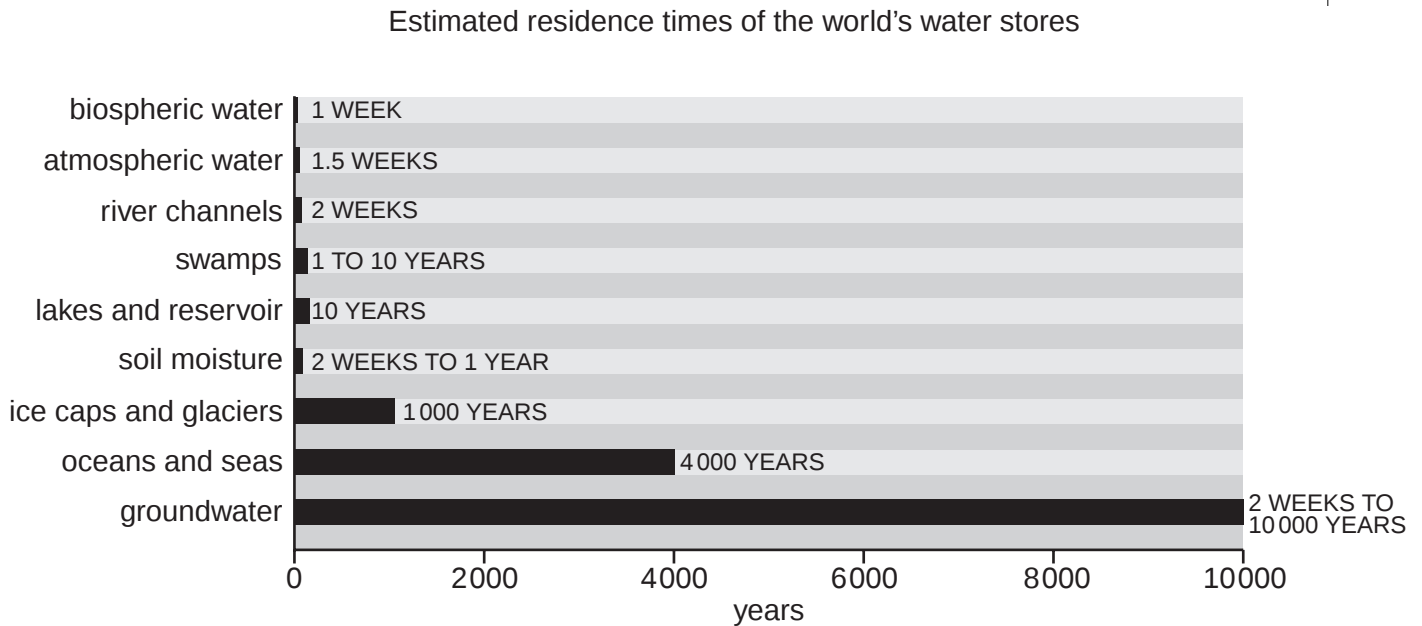
.....[1]

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

[5]

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- 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.

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

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

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

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

.....  
.....  
.....[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

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

groundwater

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

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

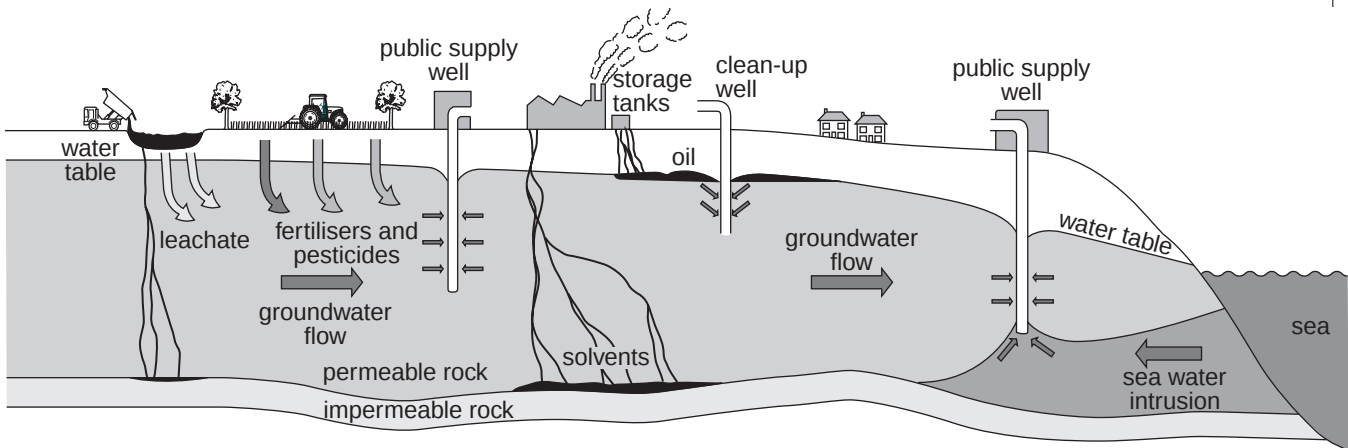


Fig. 2.2

- (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.

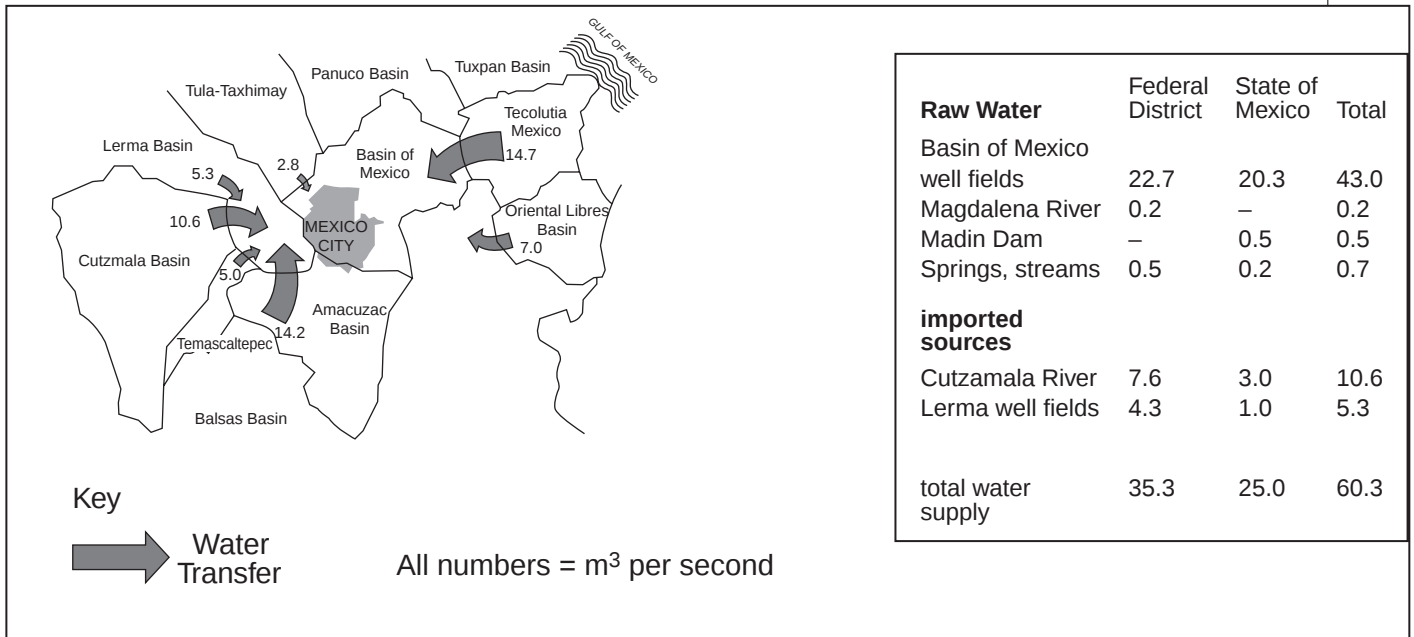
.....

.....

.....

.....[2]

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Use



**Fig. 2.3**

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

[4]

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

.....[2]

[20 marks]

## Section B

Answer **one** question from this section.

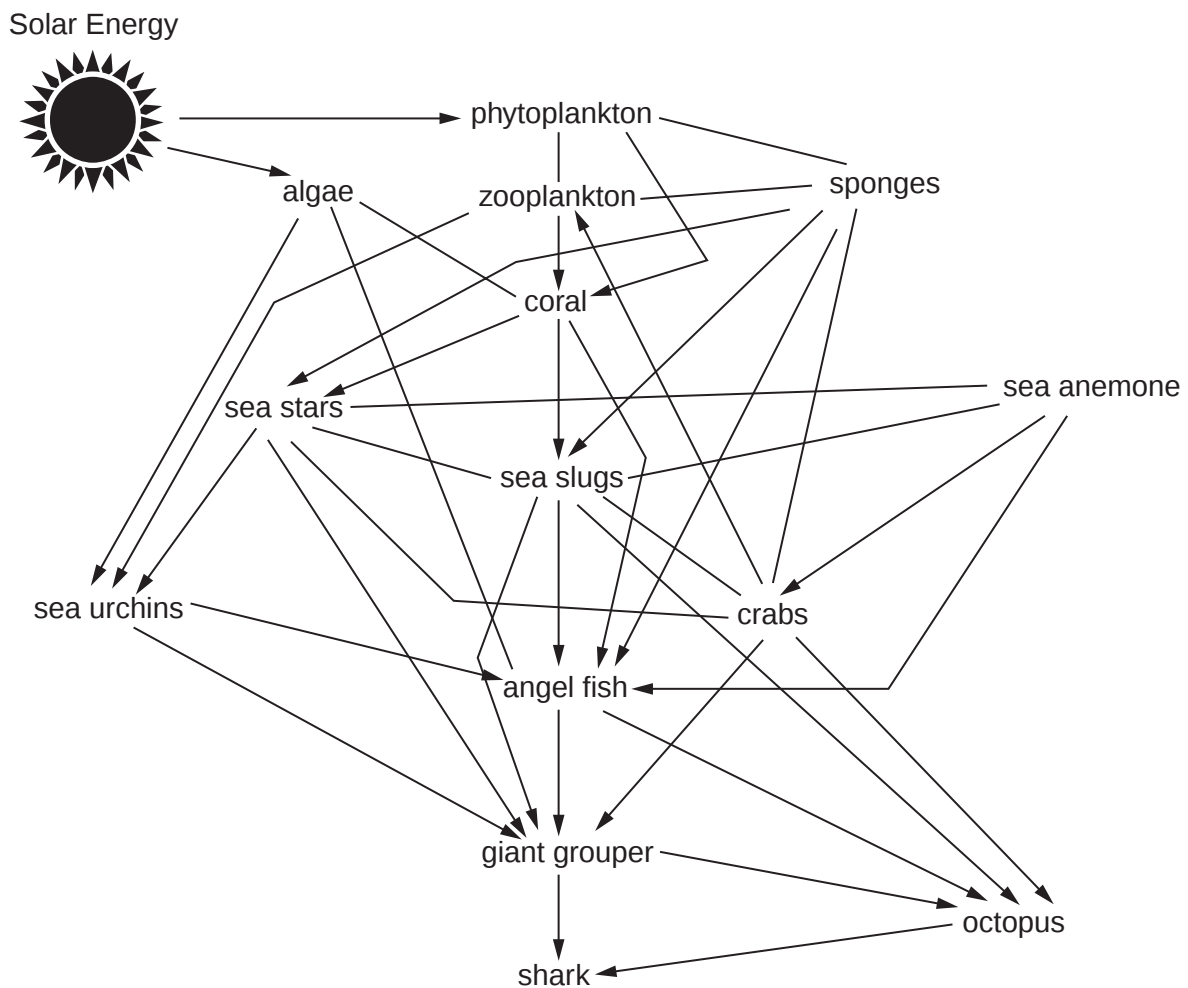
Answers must be in continuous prose.

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**

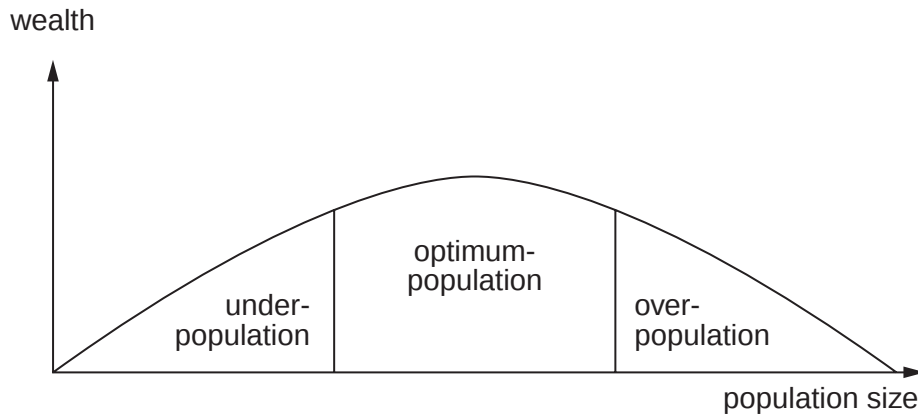


**Fig. 3.1**

- (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 (LEDs) 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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*Copyright Acknowledgements:*

Question 1                      Fig. 1.1 © [www.bio.ilstu.edu/armstrong/crtrip/photoessay](http://www.bio.ilstu.edu/armstrong/crtrip/photoessay)

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