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

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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ENVIRONMENTAL MANAGEMENT **8291/02**

Paper 2 Hydrosphere and Biosphere **May/June 2009**

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	
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.

For Examiner's Use

1 **(a)** Fig. 1.1 shows how water enters the groundwater store within a drainage basin.

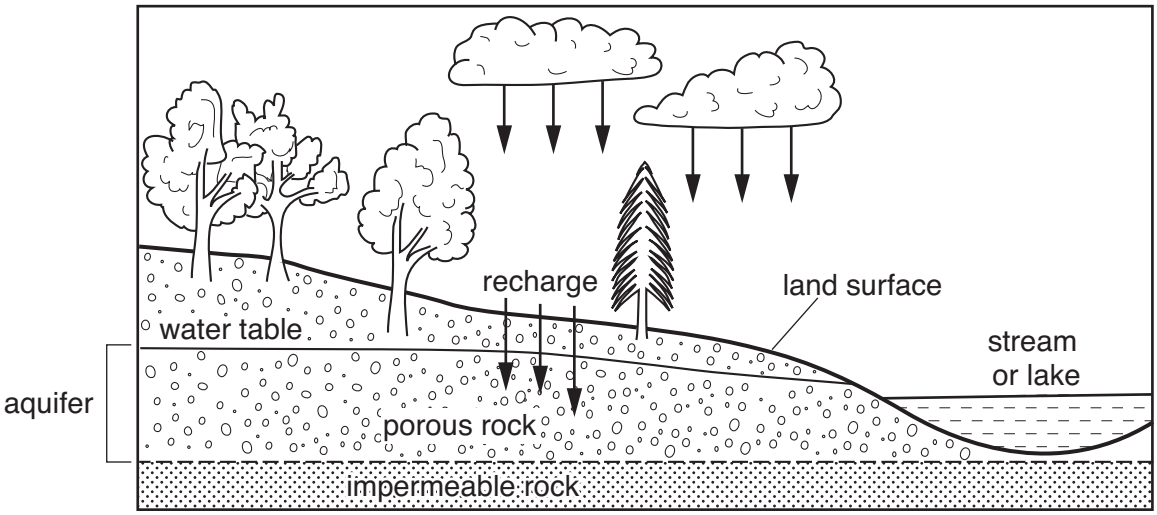

Fig. 1.1

(i) What is the meaning of the terms *water table* and *aquifer*?

water table .....

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.....

aquifer .....

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.....[2]

(ii) Explain why water can pass through a porous rock but not through an impermeable rock.

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.....[2]

(iii) Explain why the location of the water table is variable.

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.....[2]

(b) Fig. 1.2 contains some characteristic features of an artesian basin.

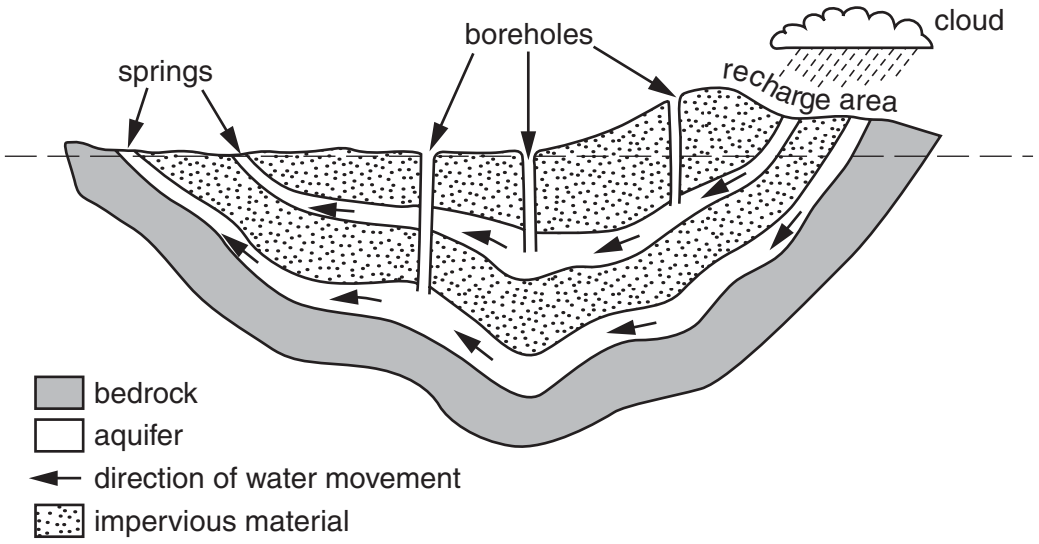

Fig. 1.2

(i) Describe the geological conditions that have enabled the development of the artesian basin shown in Fig. 1.2.

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.....[2]

(ii) Why do springs occur at the locations labelled?

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.....[2]

(iii) Suggest **two** reasons why rainfall in the recharge area may not increase the pressure of water seeping from the springs.

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.....[2]

(**iv)** Give **two** reasons for the construction of the boreholes shown in Fig. 1.2.

1 .....

.....

2 .....

.....[2]

(c) (i) Name **one** pollutant derived from industrial activity, and **one** pollutant derived from agriculture, that might contaminate groundwater.

industry .....

agriculture .....[2]

(ii) What is meant by the term *eutrophication*?
Explain how agricultural activity can cause eutrophication in a river.

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.....[4]

[Total: 20]

2 **(a)** What is meant by the term *ecosystem*?

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.....[2]

(b) Fig. 2.1 shows how energy and materials move through an ecosystem

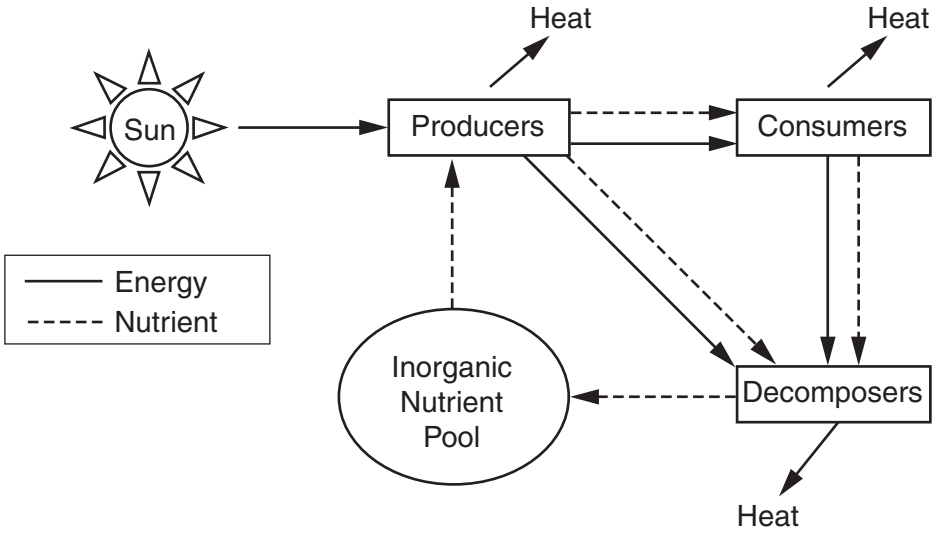

Fig. 2.1

(i) State the primary source of energy for most ecosystems.

.....[1]

(ii) Describe the flow of energy and materials shown in Fig. 2.1.

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.....[3]

(c) Explain how the equation below describes the process of photosynthesis.

For Examiner's Use

$$6CO_2 + 6H_2O \xrightarrow[\text{(chlorophyll)}]{\text{Solar Energy}} C_6H_{12}O_6 + 6O_2$$

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.....[4]

(d) Fig. 2.2 shows an energy pyramid for a North American deciduous forest.

For Examiner's Use

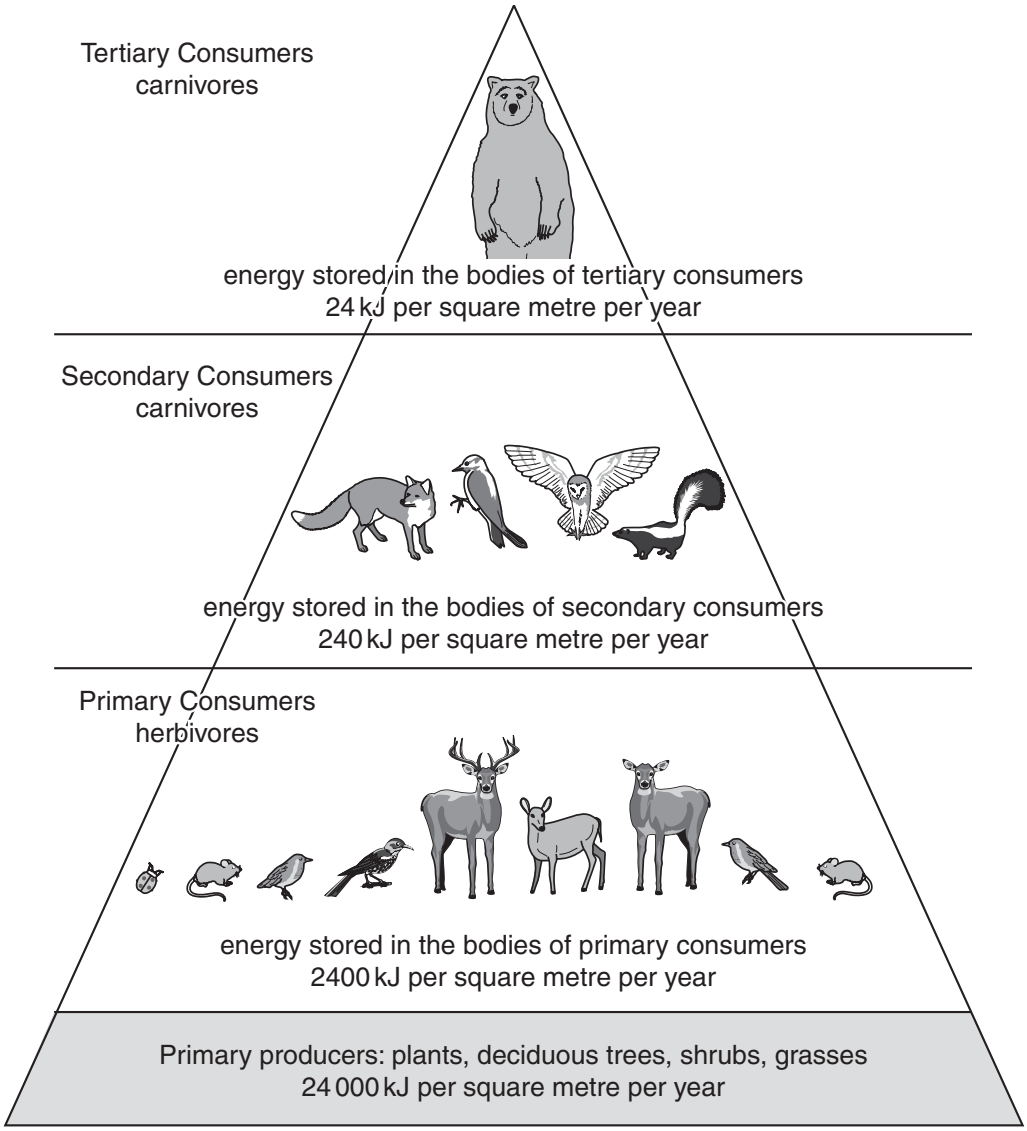

Fig. 2.2

(i) With reference to Fig. 2.2 explain what is meant by the term *trophic level.*

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.....[2]

(ii) By what percentage does the stored energy decrease from one trophic level to the next in Fig. 2.2?

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.....[1]

(iii) Use Fig. 2.2 to explain the relationship between the number of species and the amount of energy transferred from the primary consumer to the tertiary consumer stage.

For Examiner's Use

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.....[3]

(iv) Describe and explain the effect that a warming and drying of the North American deciduous forest region might have upon the energy pyramid shown in Fig. 2.2.

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.....[4]

[Total: 20]

Section B

Answer **one** question from this section.

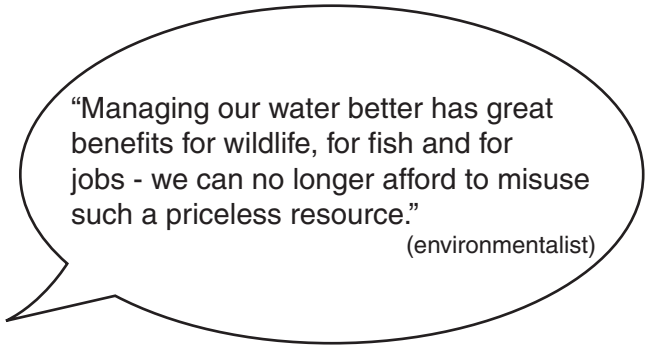
3 **(a)** Using examples from Fig. 3.1, describe how urban and agricultural activities can be both point and non-point sources of pollution. [10]

non-point pollution is experienced at some distance from its actual source
point source pollution occurs at the place of emission

sources of river pollution	
agricultural processes	**urban processes**
farm fields livestock manure and trampling	residential runoff industrial & commercial runoff construction runoff

Fig. 3.1

(b)



With reference to examples with which you are familiar, describe and assess the success of measures that aim to reduce river pollution. [30]

[Total: 40]

4 **(a)** Describe how deforestation in a Tropical Rain Forest would affect the stores and flows of nutrients shown in Fig. 4.1. [10]

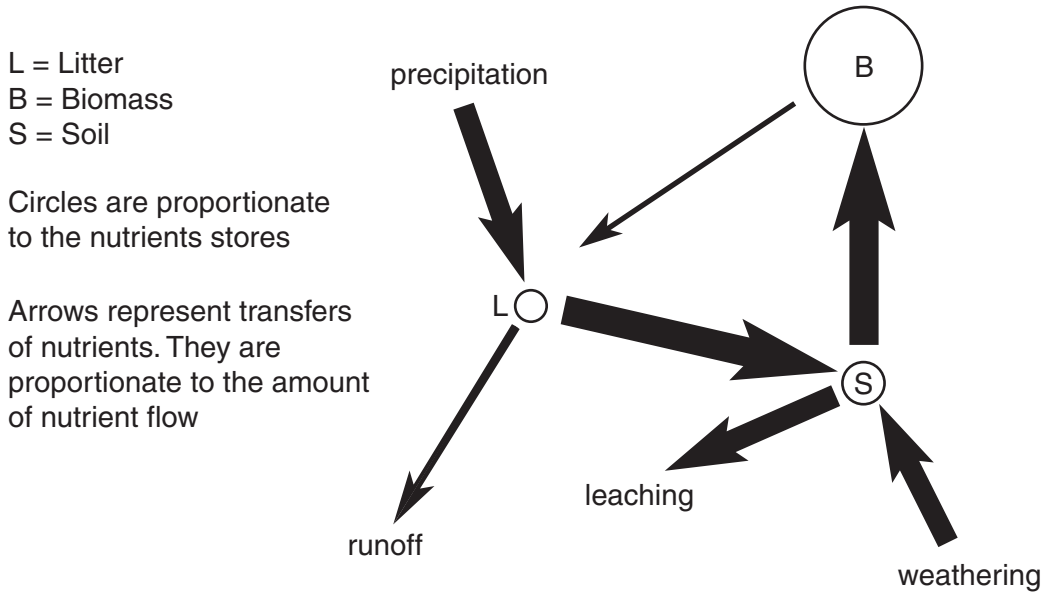


Fig. 4.1

(b) Describe how human activity can have a destructive effect upon an ecosystem or biome you have studied. Assess the measures that have been or might be adopted to limit these effects. [30]

[Total: 40]

5 **(a)** Using examples, explain how the stages shown in Fig. 5.1 provide an optimistic view of population growth and economic development for a country or region. [10]

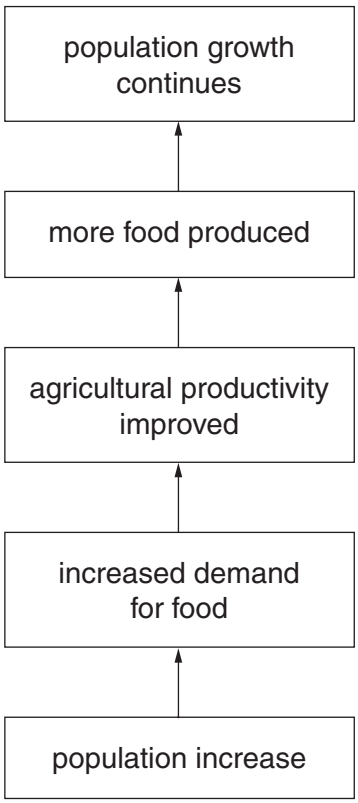


Fig. 5.1

(b) For **either** a developing country (LEDC) **or** developed country (MEDC) of your choice, describe the pressures that population growth is placing upon **either** its water resources **or** its biological resources. Assess the measures that are aimed at reducing these pressures. [30]

[Total: 40]

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