



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

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER



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.

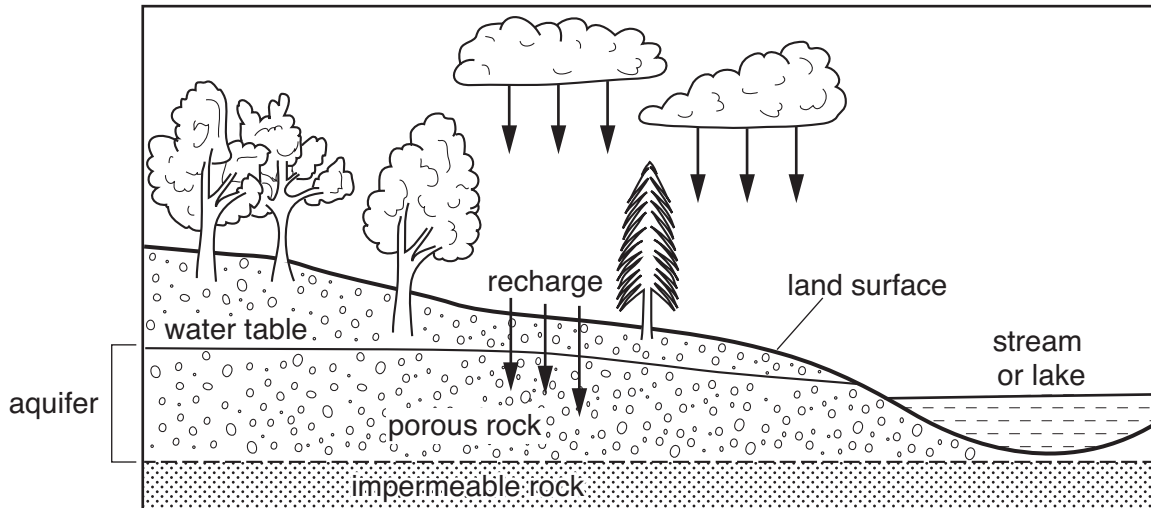


Fig. 1.1

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

water table

.....

.....

aquifer

.....

..... [2]

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

.....

.....

..... [2]

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

.....

.....

.....[2]

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

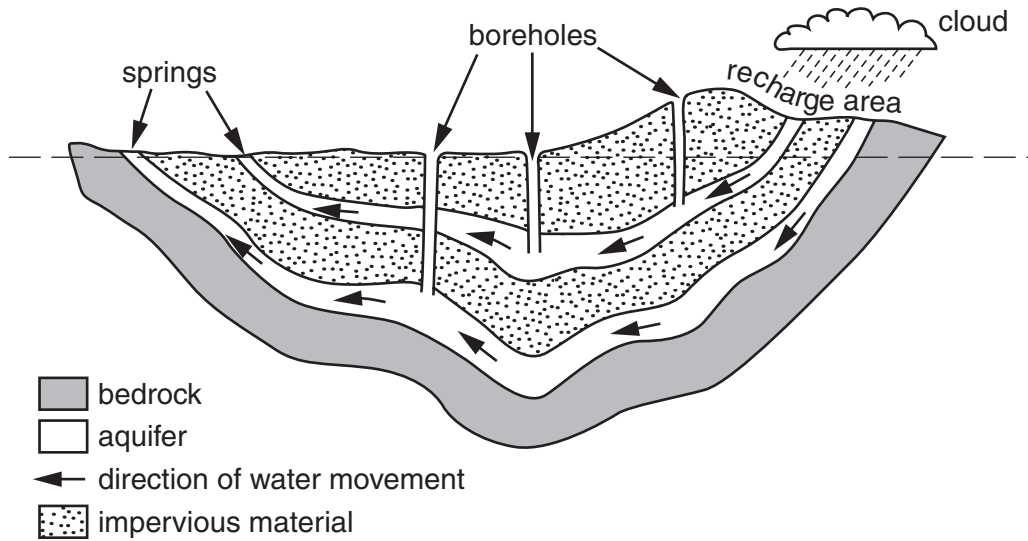


Fig. 1.2

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

.....

.....

.....

.....[2]

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

.....

.....

.....

.....[2]

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

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

.....
.....
.....
.....
.....
.....[4]

[Total: 20]

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

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

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

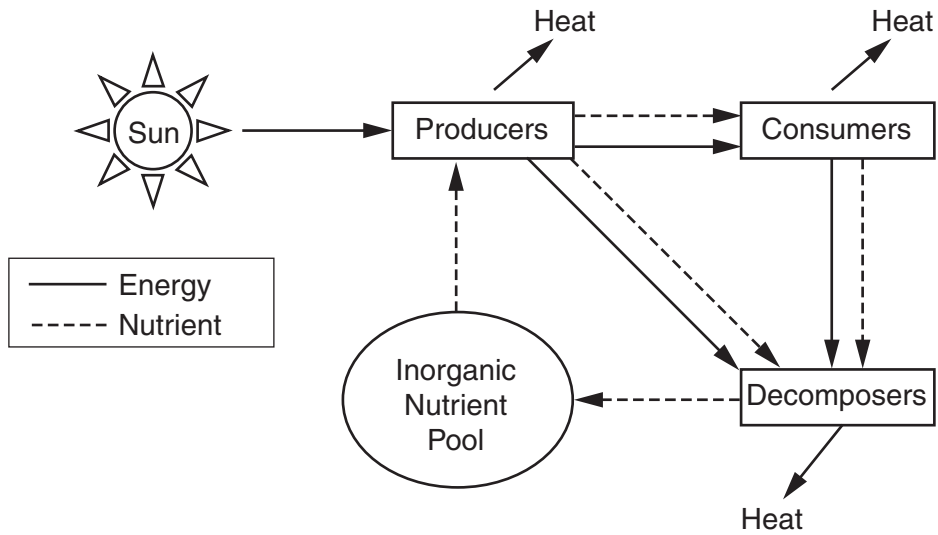


Fig. 2.1

(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]

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

For
Examiner's
Use

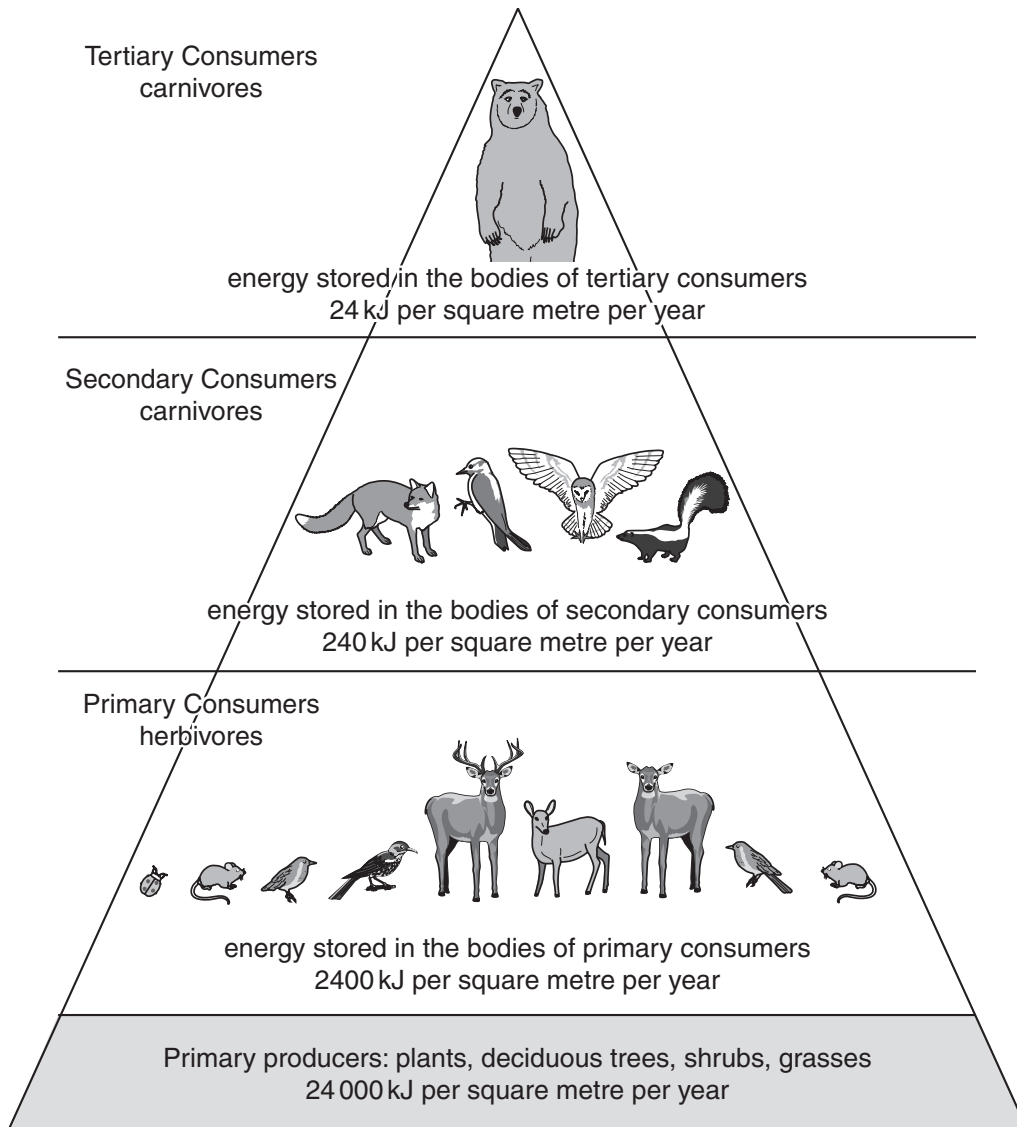


Fig. 2.2

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

.....

 [2]

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

.....
 [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.

.....

.....

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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.

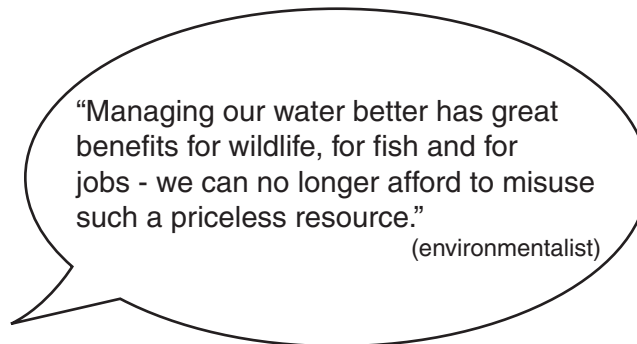
- 3 (a) Using examples from Fig. 3.1, describe how urban and agricultural activities can be both point and non-point sources of pollution. [10]

*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
<p>farm fields</p> <p>livestock manure and trampling</p>	<p>residential runoff</p> <p>industrial & commercial runoff</p> <p>construction runoff</p>

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]

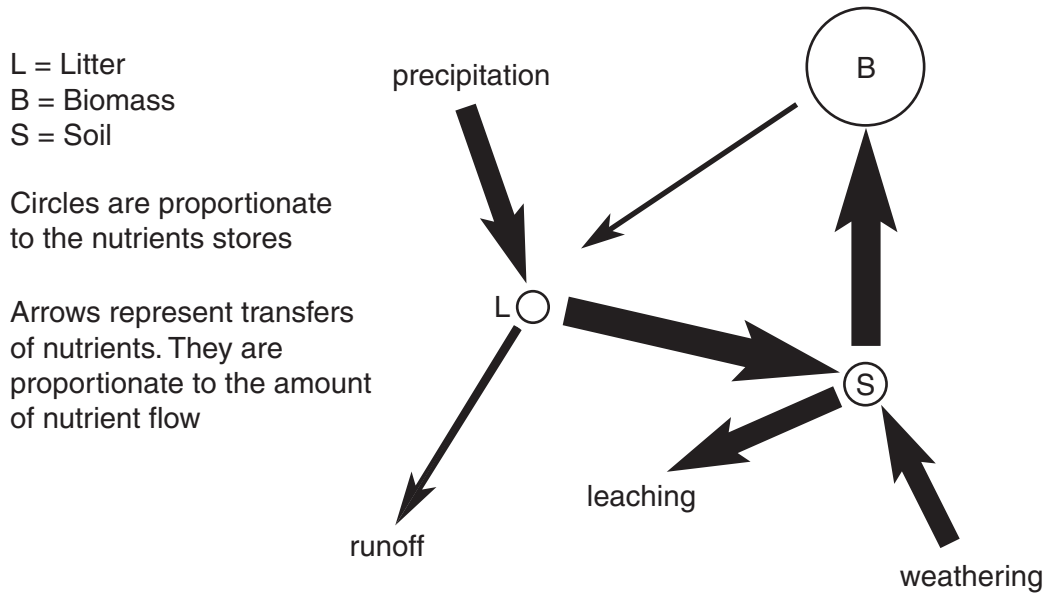


Fig. 4.1

- (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]

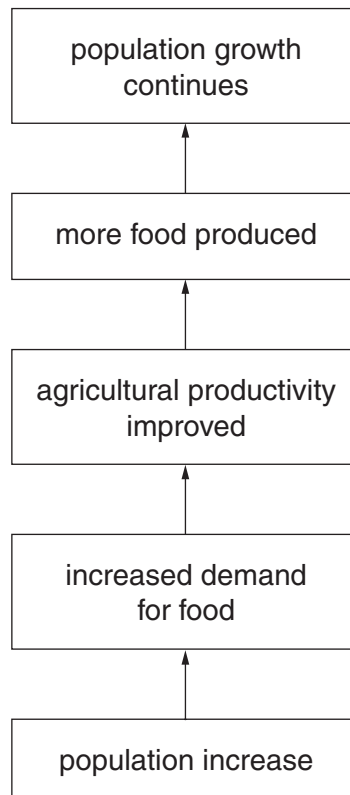


Fig. 5.1

- (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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