

CANDIDATE  
NAME

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**ENVIRONMENTAL MANAGEMENT**

**8291/22**

Paper 2 Hydrosphere and Biosphere

**May/June 2016**

**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 an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.  
**DO NOT WRITE IN ANY BARCODES.**

Electronic calculators may be used.  
You may lose marks if you do not show your working or if you do not use appropriate units.

**Section A**

Answer **all** questions in this section.  
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 **14** printed pages and **2** blank pages.

## Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

- 1 (a) Fig. 1.1 shows part of The Pantanal, the world's largest freshwater wetland located in the Paraguay River Basin in South America.

Wetlands are water-based ecosystems. They include lakes, lagoons, marshes and swamps. Wetlands contain a rich diversity of vegetation and wildlife.

The information about annual variation in temperature, precipitation and water level is for the lake labelled in the photograph.

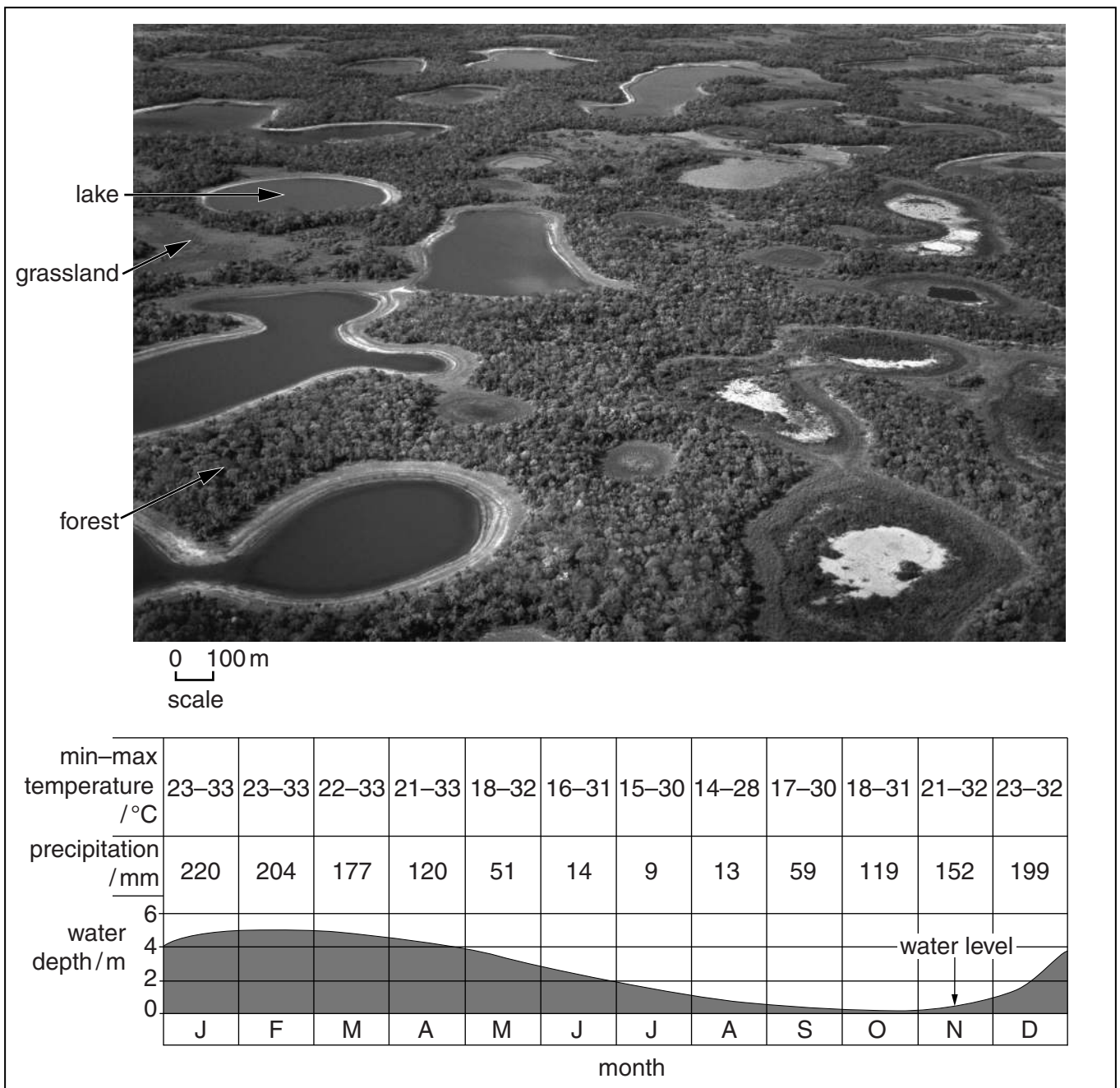


Fig. 1.1

(i) With reference to Fig. 1.1, describe the changes in the water level in the lake during the year.

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..... [2]

(ii) Calculate the annual range in the depth of water in the lake shown in Fig. 1.1.

..... [2]

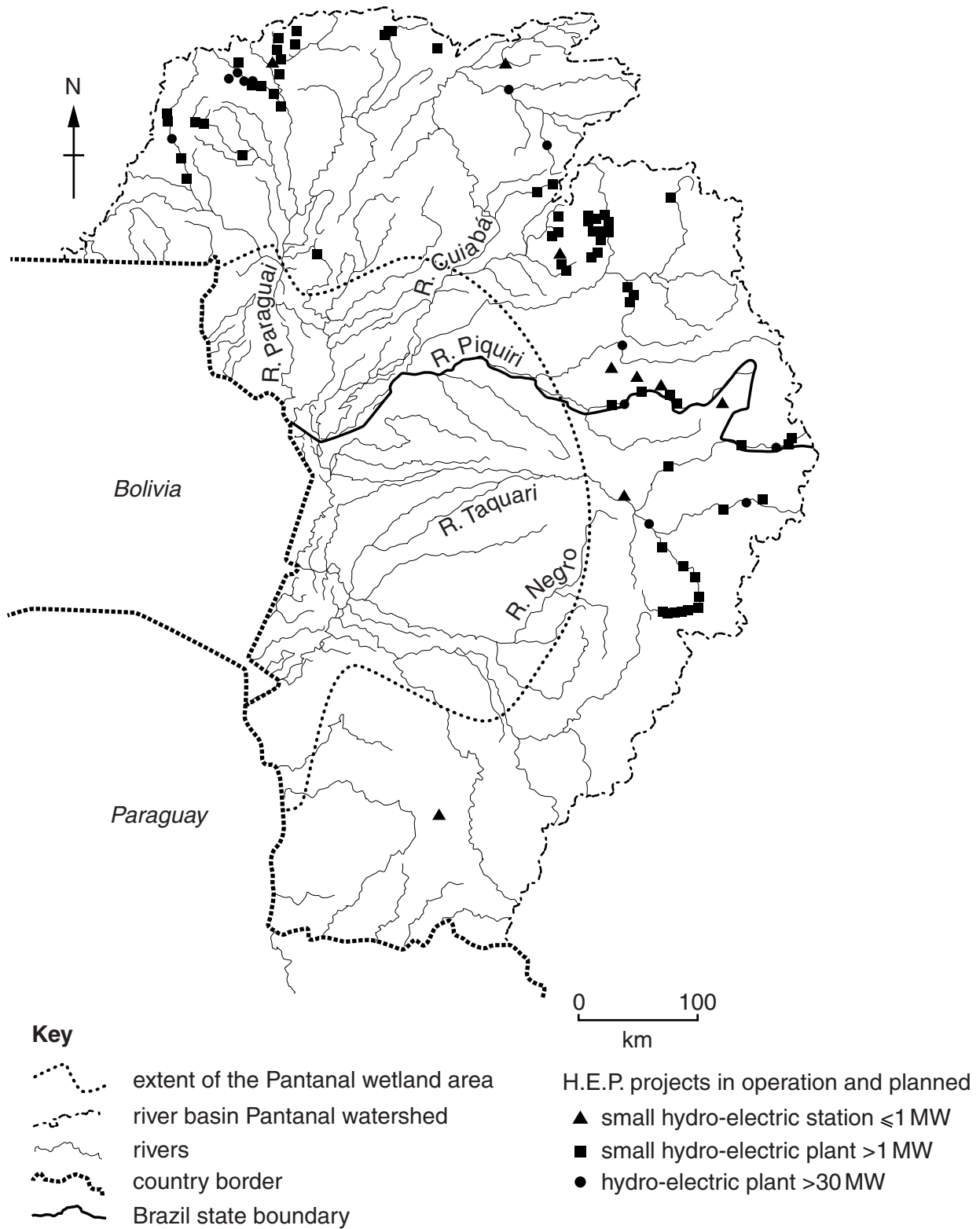
(iii) Explain how the local water cycle of the Pantanal wetland can cause the water level in the lake to change. Include information from Fig. 1.1 in your answer.

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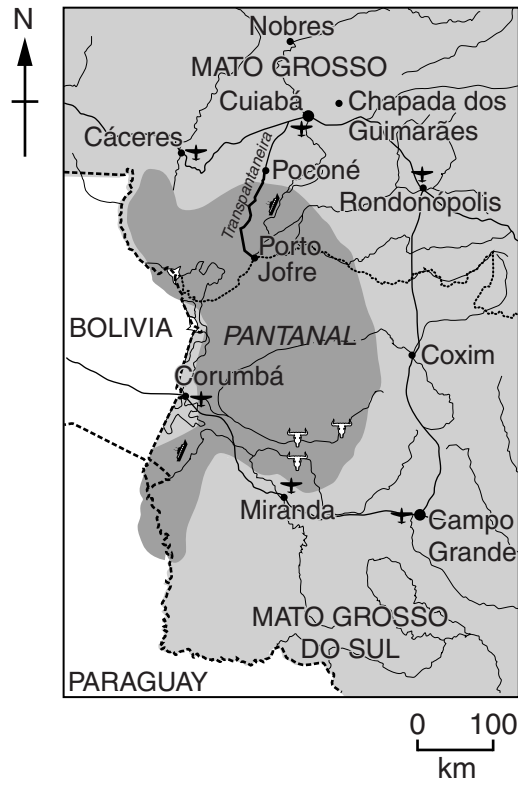
(iv) Explain why a local water cycle can be described as an open system.

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..... [2]









(b) Fig. 1.2 shows the drainage basin for the Pantanal wetland in Brazil and the location of hydro-electric power (H.E.P.) projects. Fig. 1.3 shows additional information for the same Pantanal wetland area.



**Fig. 1.2**



**Key**

- |   |                                |   |                      |
|---|--------------------------------|---|----------------------|
|  | rivers                         |  | cattle ranches       |
|  | dirt road (Transpantaneira)    |  | airport              |
|  | surfaced roads                 |  | river transportation |
|  | country border                 | •   | town                 |
|  | Brazil state boundary          | •   | city                 |
|  | Pantanal wetland               |   |                      |
|  | lowland/upland areas of Brazil |   |                      |

**Fig. 1.3**

With reference to Fig. 1.2 and Fig. 1.3, describe and explain the threats to the water stores of wetlands such as the Pantanal from human activity.

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2 (a) Fig. 2.1 shows the variations in vegetation structure, available light and the rate of photosynthesis in a tropical rainforest ecosystem.

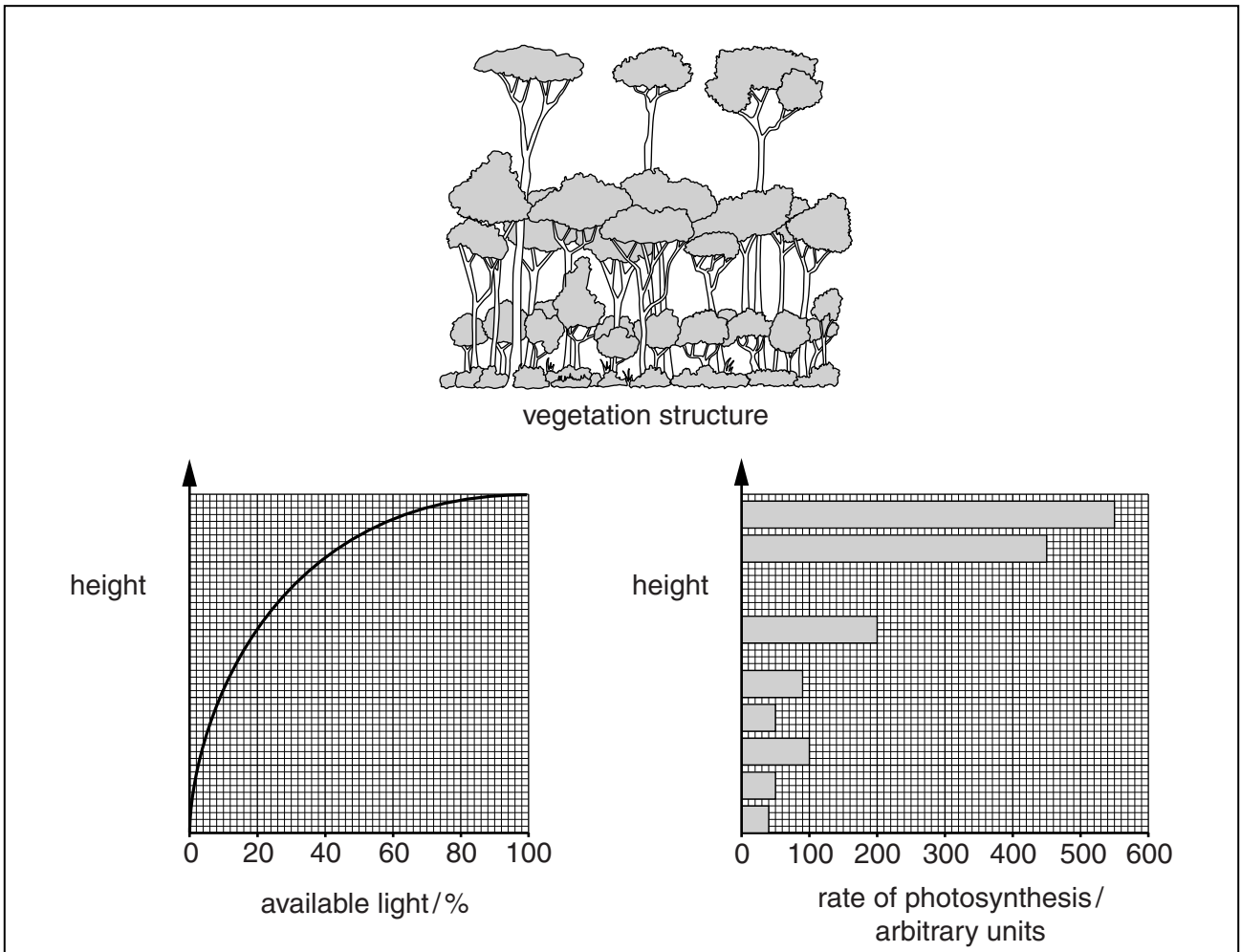


Fig. 2.1

With reference to Fig. 2.1, describe and explain the variation in the rate of photosynthesis with increasing height in the tropical rainforest.

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[4]

(b) Fig. 2.2 shows ecological pyramids for a tropical rainforest.

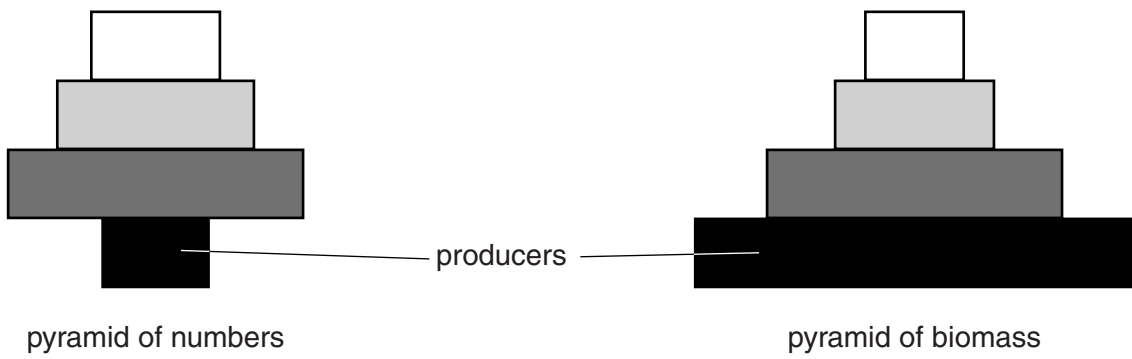


Fig. 2.2

(i) What is meant by the terms *pyramid of numbers* and *pyramid of biomass*?

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..... [2]

(ii) Describe and explain the difference in the shape of the pyramid of numbers and the pyramid of biomass for the tropical rainforest ecosystem shown in Fig. 2.2.

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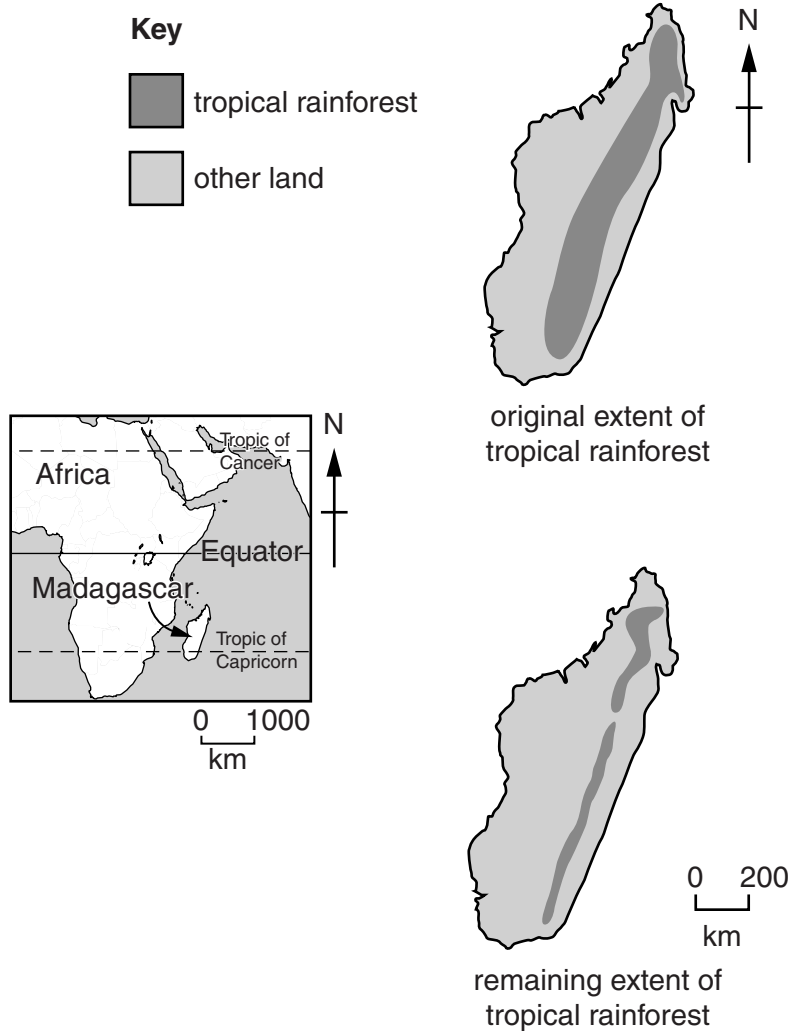
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..... [4]



- (c) Madagascar is located off the coast of East Africa in the Indian Ocean. Fig. 2.3 shows the change in the extent of tropical rainforest in Madagascar.

Fig. 2.4 shows conservation strategies which aim to reduce further negative impact from human activity upon the tropical rainforest.



**Fig. 2.3**

- (i) Suggest **two** reasons for the change in the extent of tropical rainforest in Madagascar shown in Fig. 2.3.

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.....[2]

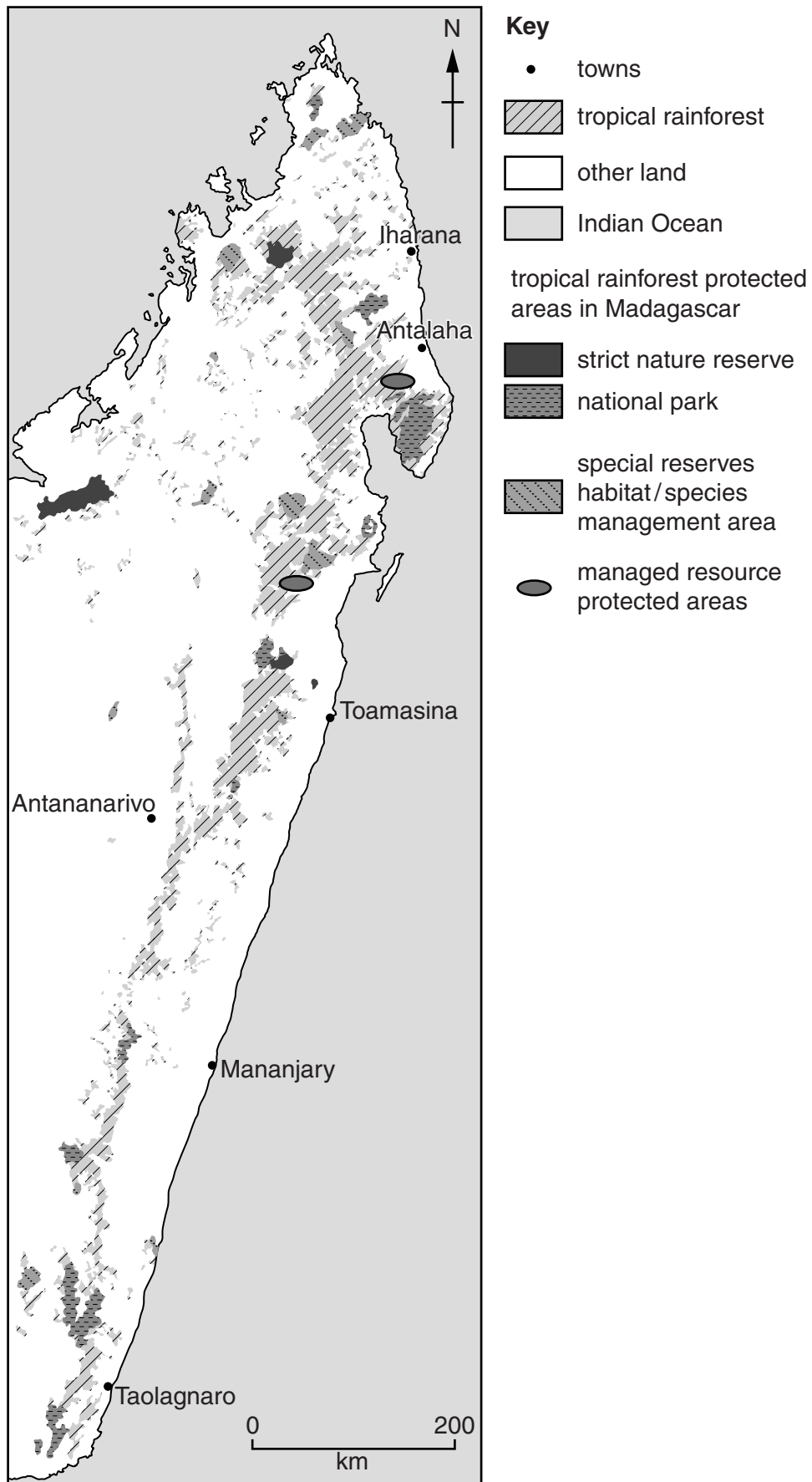


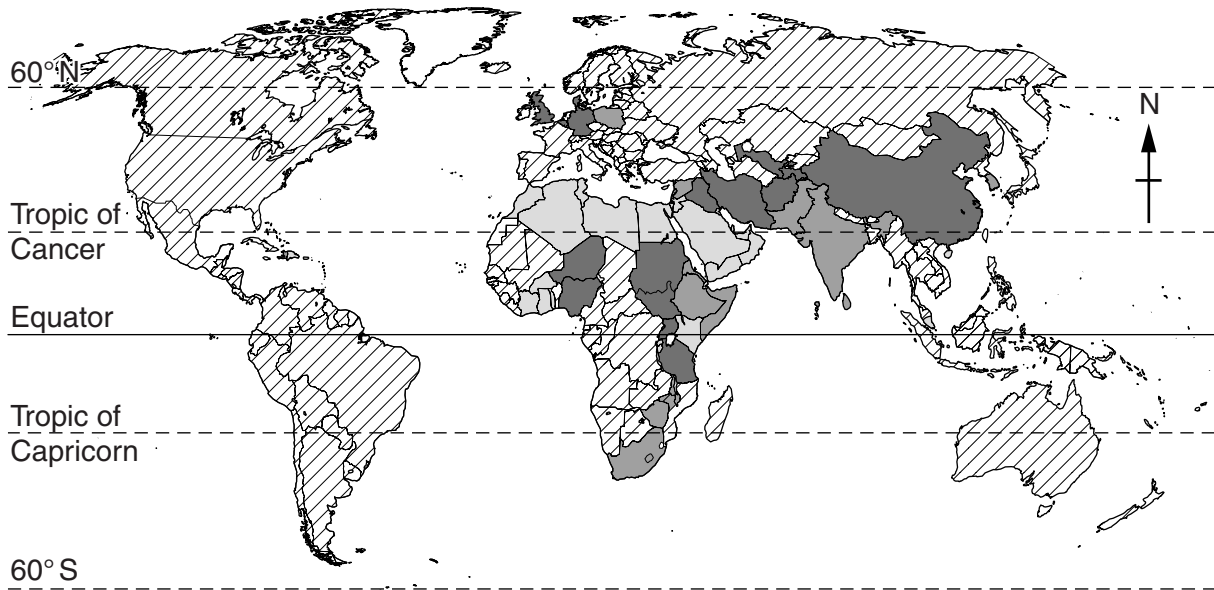
Fig. 2.4



## Section B

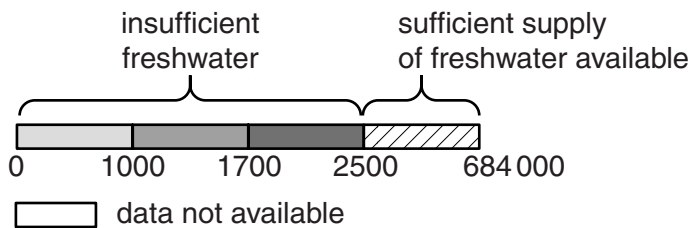
Answer **one** question from this section.

- 3 Fig. 3.1 shows the global availability of freshwater in cubic metres per person per year in 2007.



## Key

freshwater availability / cubic metres per person per year

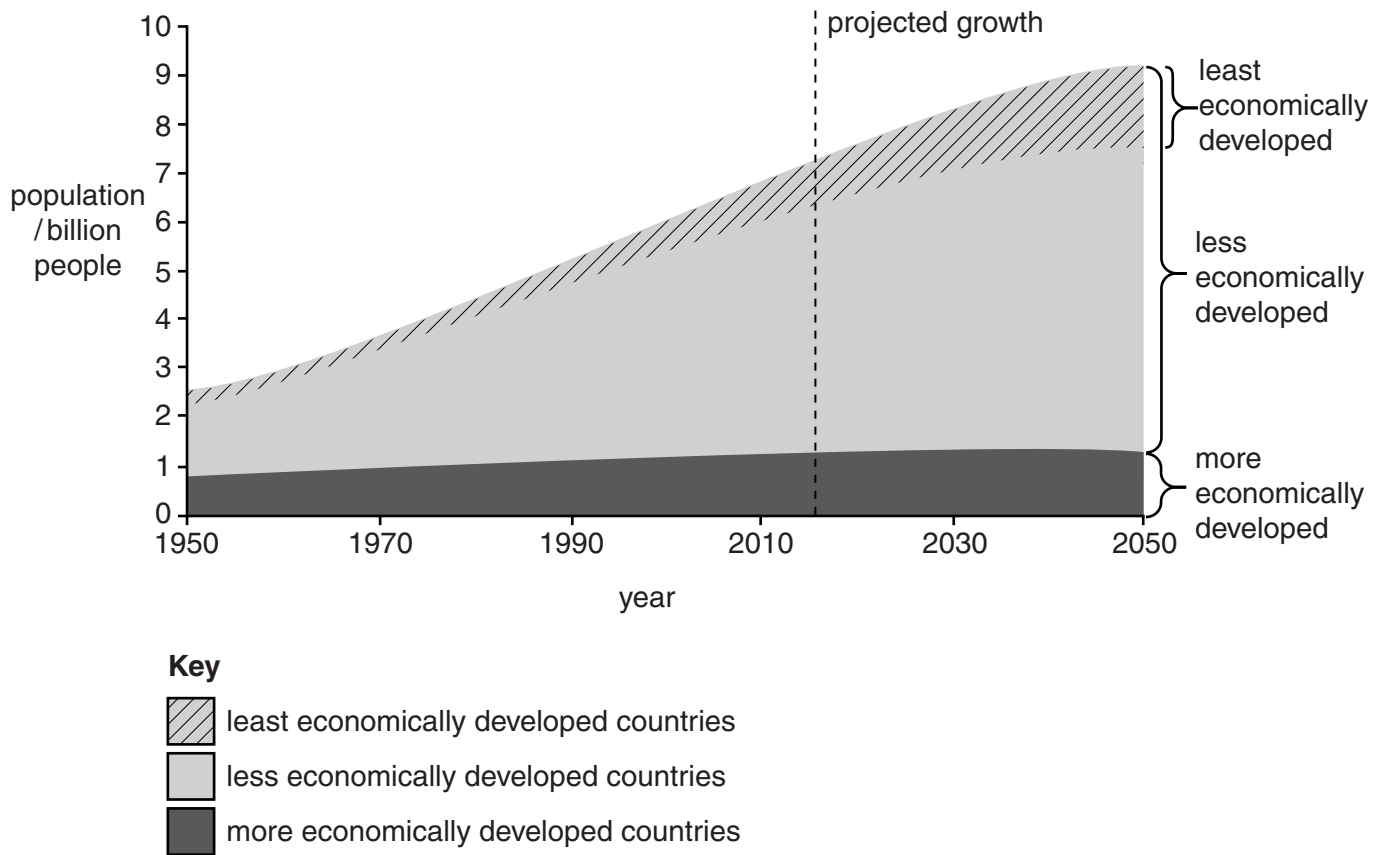


**Fig. 3.1**

- (a) With reference to Fig. 3.1, describe and suggest reasons for the distribution of areas which have insufficient freshwater resources available. [10]
- (b) Using examples, describe ways in which insufficient supplies of water can be managed. Assess to what extent the difficulties encountered in providing a sustainable freshwater supply are being overcome. [30]

[Total: 40]

- 4 Fig. 4.1 shows the population growth since 1950 and projected population growth to 2050 for countries at different levels of economic development.

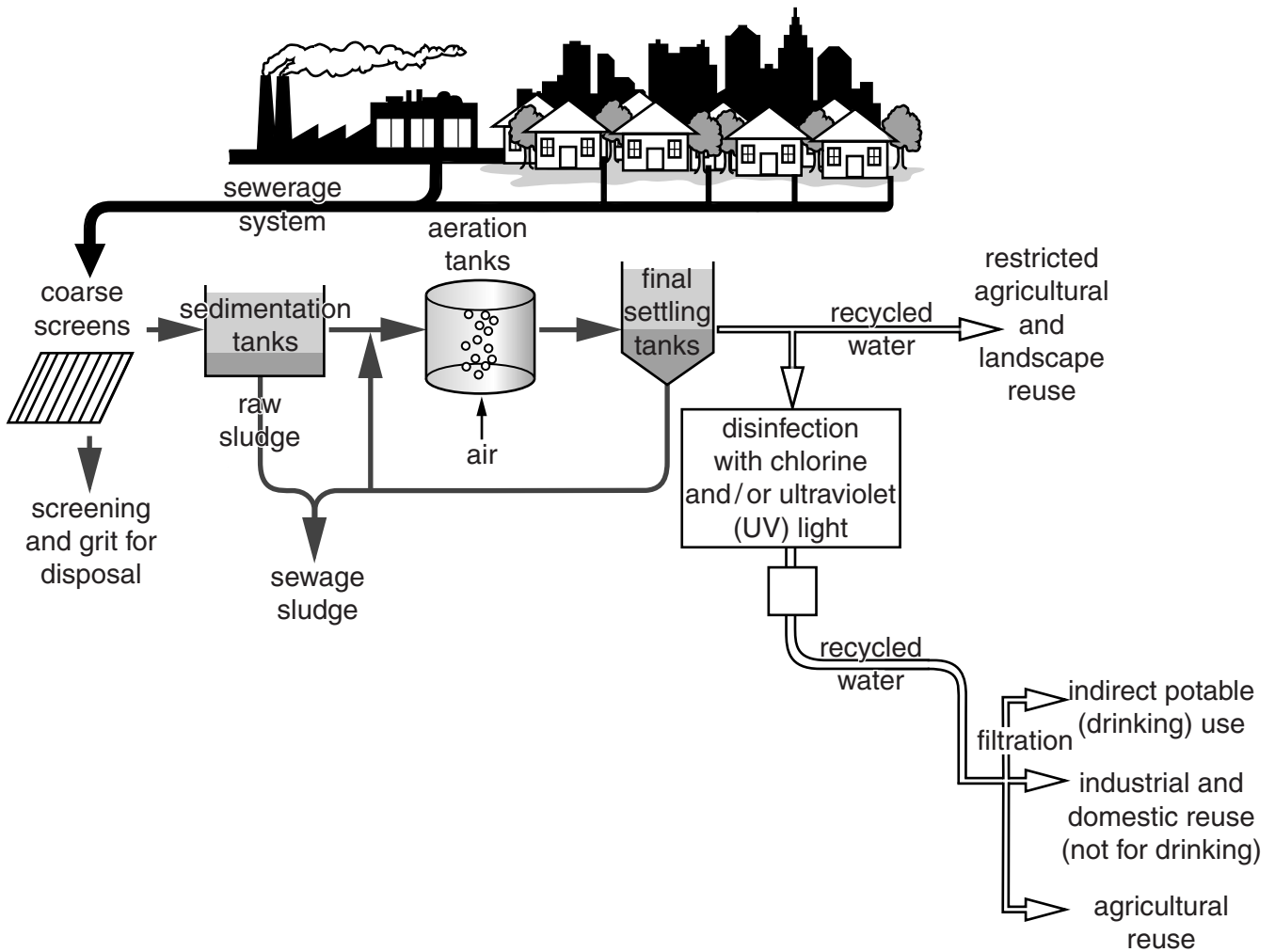


**Fig. 4.1**

- (a) With reference to Fig. 4.1, describe and explain the trends shown in population growth and projected growth to 2050 for countries at different levels of economic development. [10]
- (b) With reference to population models, discuss whether economic and social development is unsustainable as world population continues to increase. Use examples from different countries. [30]

[Total: 40]

5 Fig. 5.1 shows processes involved in the treatment of sewage.



**Fig. 5.1**

- (a) With reference to Fig. 5.1, outline benefits and problems for health and the environment of the processes involved in the treatment of sewage. [10]
- (b) Using examples, assess the extent to which river management policies are effective in controlling river pollution. [30]

[Total: 40]



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