



**ECOSYSTEMS AND SOCIETIES
STANDARD LEVEL
PAPER 1**

Friday 2 November 2007 (afternoon)

1 hour

Candidate session number

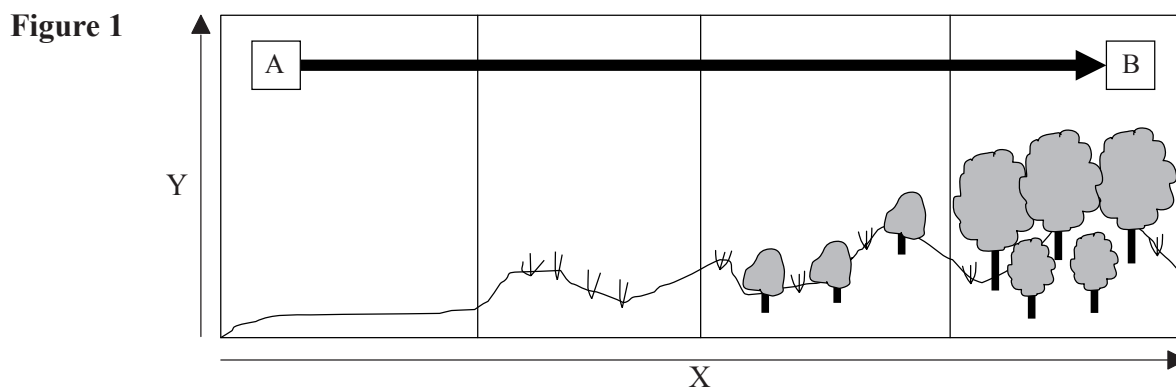
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INSTRUCTIONS TO CANDIDATES

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all of the questions in the spaces provided. You may continue your answers on answer sheets. Write your session number on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.
- At the end of the examination, indicate the number of answer sheets used in the appropriate box on your cover sheet.



1. **Figure 1** shows succession in a sand dune ecosystem.



- (a) (i) Define the term *succession*. [2]

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- (ii) State what variable may be appropriate for the x-axis in **Figure 1**. [1]

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- (iii) Outline what will happen to soils as the ecosystem in **Figure 1** changes from A to B. [2]

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- (b) State what is happening within a system when a decrease in variable “P” leads to a decrease in variable “Q” which in turn leads to a further decrease in variable “P”. [1]

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2. **Figure 2(a)** Relationship between number of rodent species and altitude

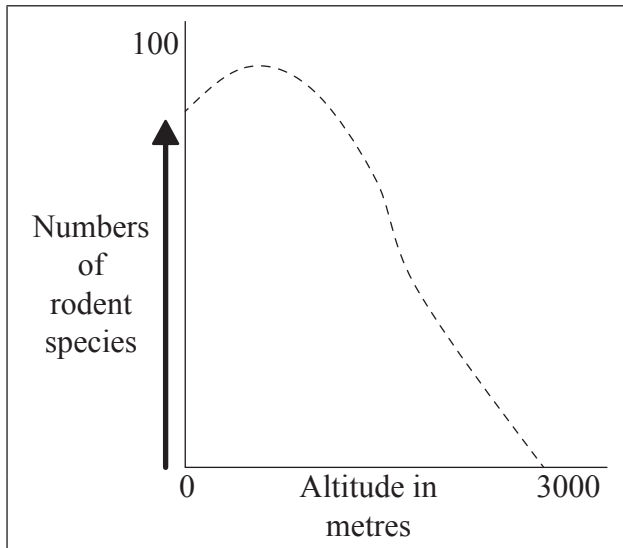
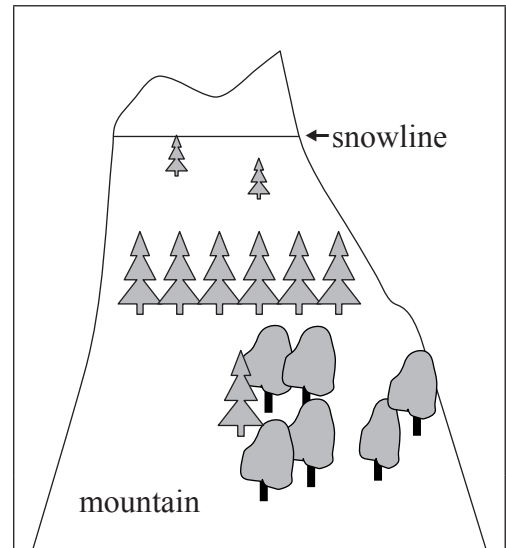


Figure 2(b) Altitude habitat model



- (a) With reference to **Figure 2(a)** describe the relationship which appears to exist between altitude and the number of rodent species. [1]

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- (b) Predict **three** ways in which the altitude habitat model in **Figure 2(b)** might change as a result of global warming. [3]

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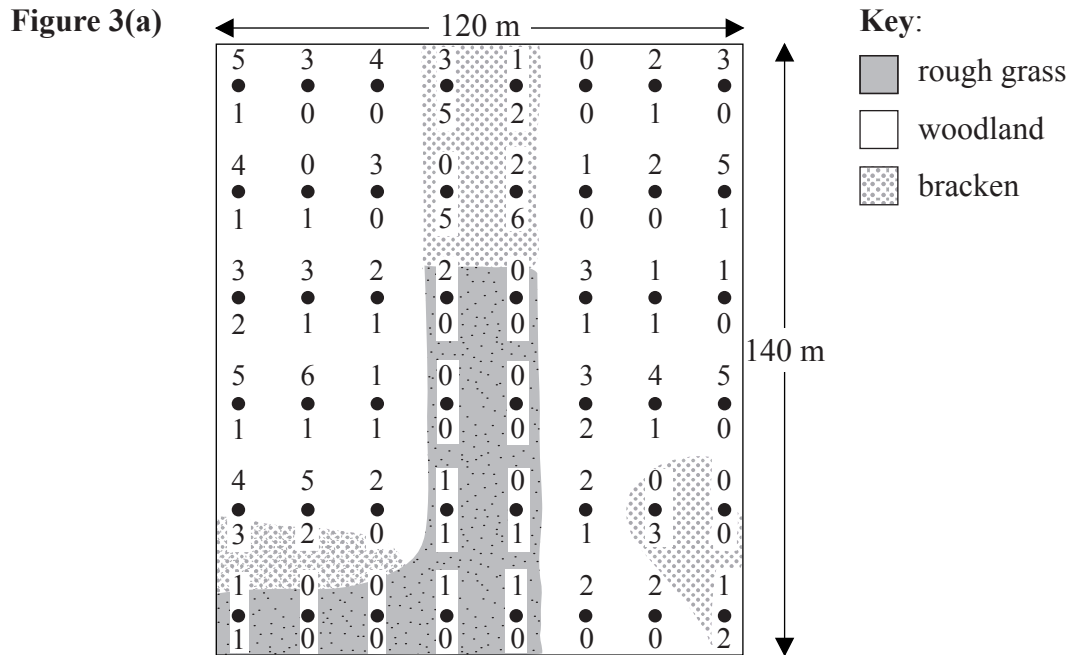
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(Question 2 continued)

- (c) **Figure 3(a)** shows the numbers of wood mice and bank voles collected from traps.

The number above the trapping point (●) represents wood mice and the number below the trapping point (●) represents bank voles.



[Source: A Cadogan and G Best, *Environment and Ecology*, page 51, Blackie and Sons Ltd, 1992]

Figure 3(b)

	Rough grass	Woodland	Bracken
Wood mice	6	50	
Bank voles	3	15	

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(Question 2(c) continued)

- (i) Complete **Figure 3(b)** by calculating the numbers of wood mice and bank voles found in bracken. [1]

- (ii) Suggest **two** reasons for the relationship between numbers of wood mice and bank voles and habitat shown in **Figure 3(a)** and **Figure 3(b)**. [2]

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- (iii) Explain why the wood mice and bank voles were marked and released after capture. [1]

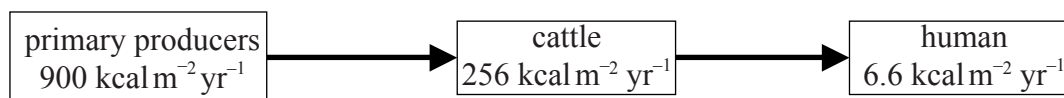
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3. Figure 4 shows energy flow through a food chain.

Figure 4



- (a) (i) Calculate the percentage energy loss to humans from the initial input of $900 \text{ kcal m}^{-2} \text{ yr}^{-1}$. [2]

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- (ii) Explain why farming systems based on crop production are more energy efficient than harvesting from the sea. [2]

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- (iii) Suggest **two** ways in which energy may be lost from the system. [2]

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(Question 3 continued)

- (b) (i) Suggest **three** reasons why livestock (cattle, goats, sheep, *etc.*) form a part of most farming systems. [3]

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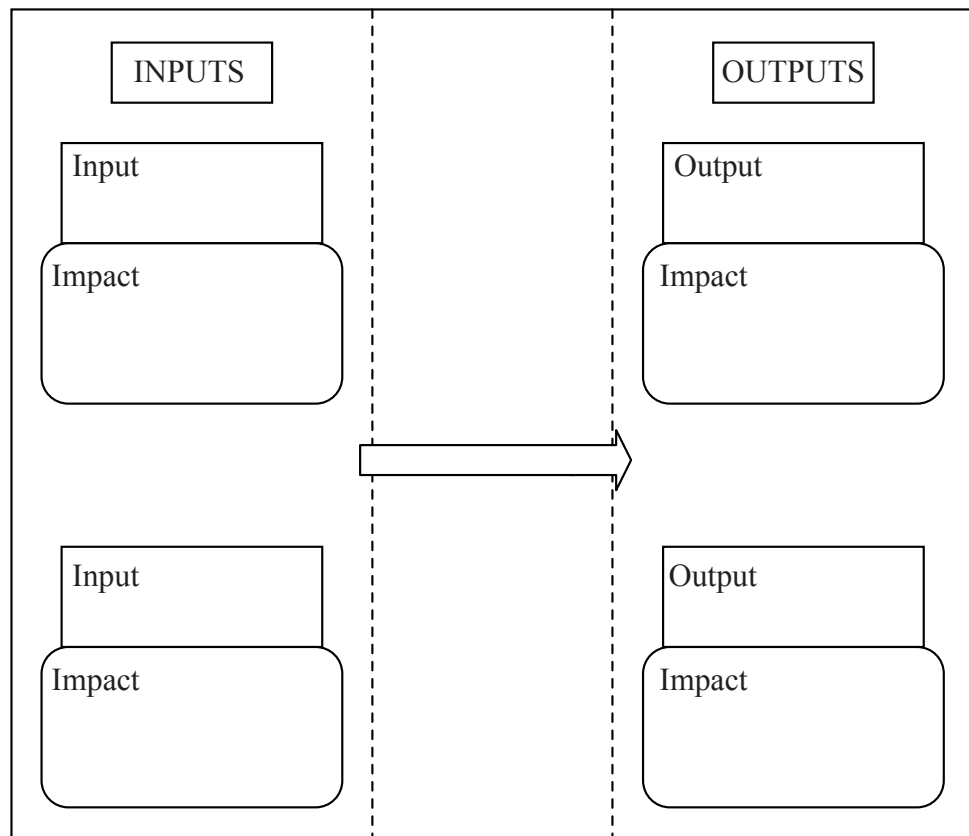
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- (ii) **Figure 5** shows a systems diagram for a farm. Annotate the diagram to show **two** inputs and **two** outputs, and their possible environmental impacts. [4]

Figure 5



4. (a) Suggest why the size of a nature reserve is an important factor for the conservation of large animals. [3]

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- (b) Outline what is meant by the term *species based conservation*. [2]

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- (c) Outline **two** historic causes of mass extinction. [2]

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(Question 4 continued)

- (d) **Figure 6** shows reasons why some plant species have become endangered.

Figure 6

Threat	Number of endangered species
Collecting by gardeners/tourists	35
Overgrazing	33
Populations critically low for breeding	31
Clearance for agriculture	22
Industrial and urban growth	16
Logging in forests	12
Dams and flooding	8
Changes in farming practice	6

[Source: adapted from Chapman and Reiss, *Ecology principles and application*, page 279, CUP, 1999]

Select **two** threats from the table in **Figure 6** and suggest a conservation strategy for reducing each threat.

[4]

Name of threat:

Conservation strategy:

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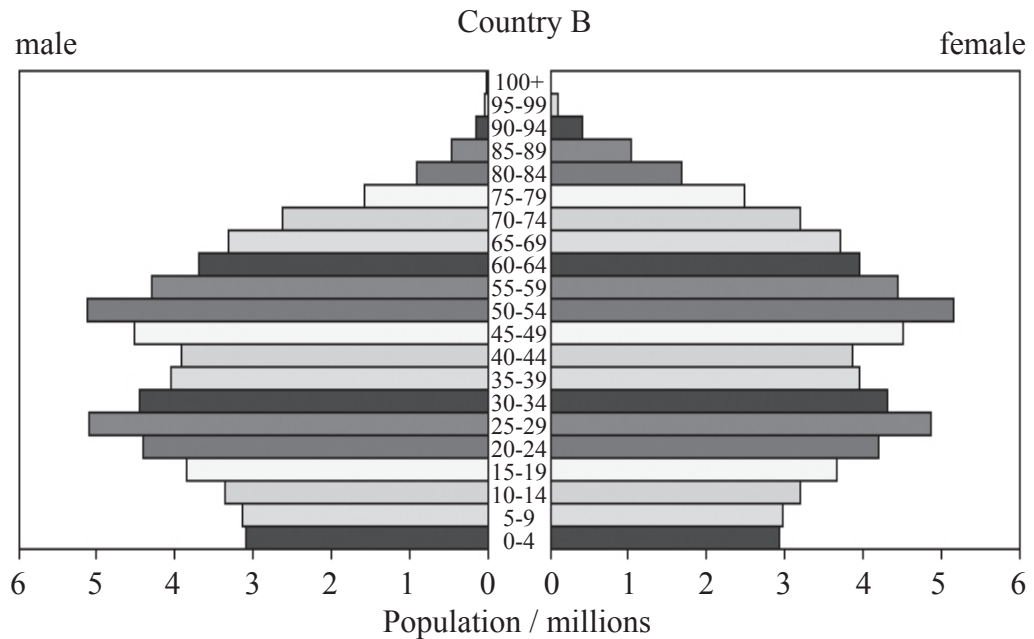
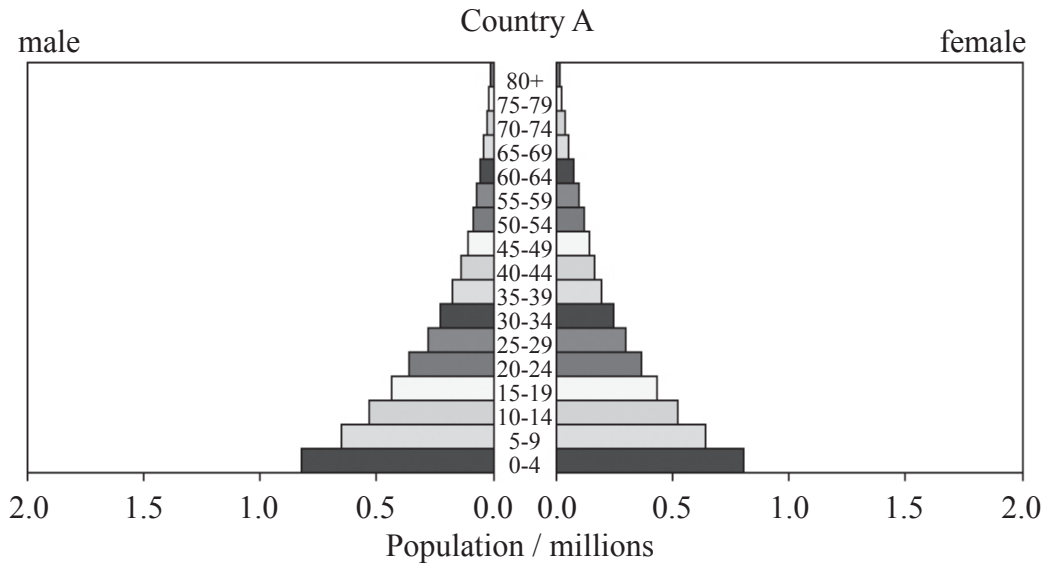
Name of threat:

Conservation strategy:

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5. **Figure 7(a)** shows the population pyramids for an MEDC and LEDC in the year 2000 and **Figure 7(b)** shows two ecological footprints.

Figure 7(a)



[Source: adapted from <http://www.census.gov/cgi-bin/ipc/idbpyrs.pl?cty=CD&out=s&ymax=300>]

Figure 7(b)

Ecological footprint for 2001	
Footprint X	1.5 Global hectares per person
Footprint Y	4.3 Global hectares per person

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(Question 5 continued)

- (a) State **two** differences between the population pyramids shown in **Figure 7(a)**. [2]

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- (b) (i) With reference to **Figure 7(a)** and **Figure 7(b)**, deduce which footprint belongs to country A and which footprint belongs to country B. [1]

Country A:

Country B:

- (ii) Justify your answer to (b)(i). [1]

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6. **Figure 8** shows population change and water consumption for 1971 and 2001 in an MEDC.

Figure 8

	1971	2001	Growth rate per year
Population / 10⁶	48.6	57	0.53 %
Total water consumption / 10⁶ m³ day⁻¹	42.7	83.3	2.3 %

- (a) Compare relative growth rates for population and water consumption between 1971 and 2001. [1]

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- (b) Suggest **two** factors which may explain the difference you have identified in (a). [2]

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