



**ECOSYSTEMS AND SOCIETIES
STANDARD LEVEL
PAPER 1**

Tuesday 10 November 2009 (afternoon)

Candidate session number

1 hour

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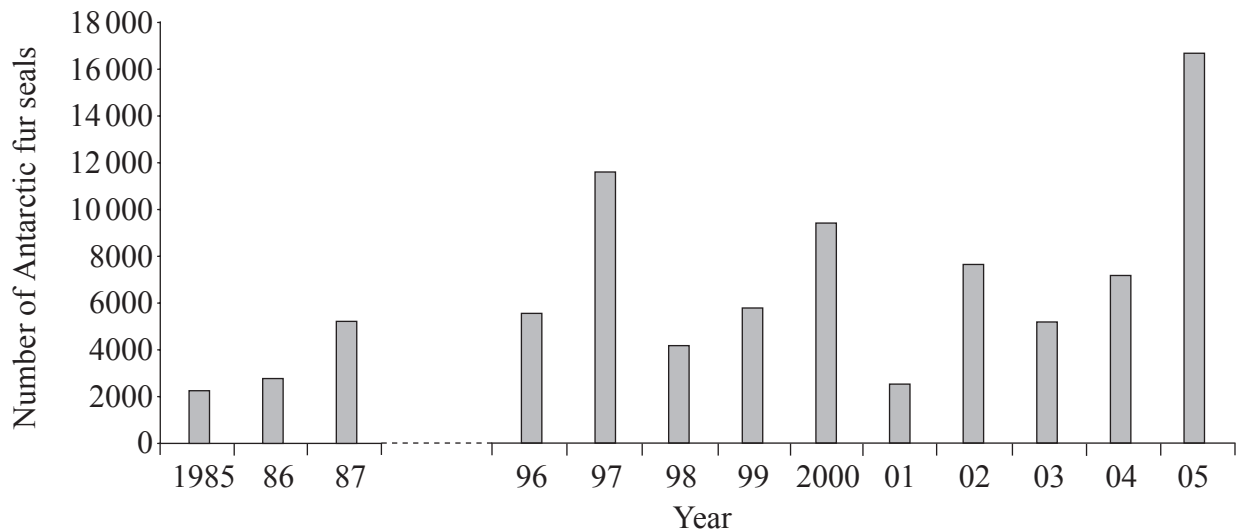
INSTRUCTIONS TO CANDIDATES

- 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. The bar chart in **Figure 1(a)** shows the number of Antarctic fur seals (*Arctocephalus gazella*) recorded on a sub-Antarctic island for various years.

Figure 1(a)



[Source: Adapted from Alejandro R Carlini, et al., "Haul-out pattern of itinerant male Antarctic fur seals (*Arctocephalus gazella*) at Laurie Island, South Orkney Islands", *Polar Research*, 25(2), pages 139-144. © John Wiley & Sons]

Figure 1(b) Antarctic fur seal



[Source: Antarctic Fur Seals at South Georgia Island. This file is licensed under the Creative Commons Attribution-Share Alike 1.0 Generic license.]

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(Question 1 continued)

- (a) Describe **two** methods that could have been used to collect the data in the bar chart shown in **Figure 1(a)**. [2]

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- (b) (i) Describe the trends shown in the bar chart. [2]

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- (ii) Explain the trends shown in the bar chart. [3]

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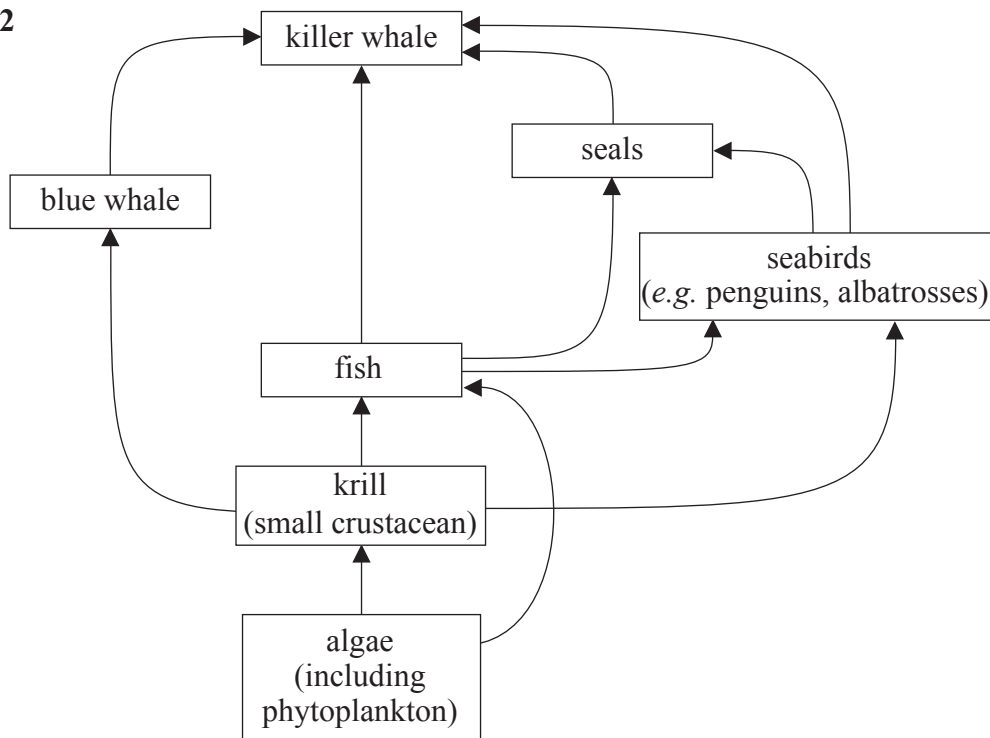
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2. The food web diagram in **Figure 2** shows some of the food relationships in the Antarctic marine (southern ocean) ecosystem.

Figure 2



- (a) Using the food web diagram above, identify **one** organism for each of the trophic levels in the table below. [2]

Trophic level	Organism
Top carnivore	
Producer	
Primary consumer (herbivore)	
Secondary consumer (carnivore)	

- (b) Draw a pyramid of numbers to represent the relative numbers of the organisms you named in the table above. [2]

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(Question 2 continued)

(c) (i) Define the term *negative feedback*. [1]

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(ii) Using the food web diagram opposite, outline **one** example of negative feedback. [2]

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(d) Commercial whaling was banned over twenty years ago. Identify, with a reason, **one** change that might occur in the Antarctic marine ecosystem if commercial whaling of blue whales were to start again. [2]

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(e) Determine the type of natural capital provided by a population of whales. Justify your answer. [2]

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(f) (i) Identify **one** important abiotic factor within a marine ecosystem. [1]

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(ii) Describe a method for measuring this abiotic factor. [2]

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3. (a) Describe the role of the Antarctic ice cap in the world's hydrological cycle. [2]

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(b) (i) Discuss the effect that an increase in the amount of carbon dioxide in the atmosphere might have on Antarctica's **terrestrial** ecosystems. [3]

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(ii) Explain why the increase in carbon dioxide in part (b)(i) might occur. [1]

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4. (a) State the difference between the terms *species diversity* and *habitat diversity*. [2]

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(b) (i) Briefly describe a **named** protected area that you have studied and identify the habitats present. [2]

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(ii) Describe **two** measures that have been taken, or might be taken, to protect the species diversity and habitat diversity of the protected area you named in part (b)(i). [2]

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5. (a) Outline how you would compare the diversity in the aquatic insect faunas of **two** similarly sized ponds. [3]

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- (b) Explain why the results from the study in part (a) could be important for the conservation of the **two** pond ecosystems. [2]

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6. (a) Identify **one** species of plant **or** animal that has become extinct within the last 500 years. [1]

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(b) Explain **three** of the factors involved in the extinction of the species identified in part (a). [3]

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7. Explain, with examples, why the ecosystems of the world should not be considered solely in terms of their commercial value. [3]

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