



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

CANDIDATE
 NAME

CENTRE
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MARINE SCIENCE

9693/01

Paper 1 AS Structured Questions

May/June 2008

1 hour 30 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

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 pencil for any diagrams, graphs or rough work.

Do not use staples, paper clips, highlighters, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer **all** questions.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
Total	

This document consists of **15** printed pages and **1** blank page.



1 Fig. 1.1 shows part of a marine food web.

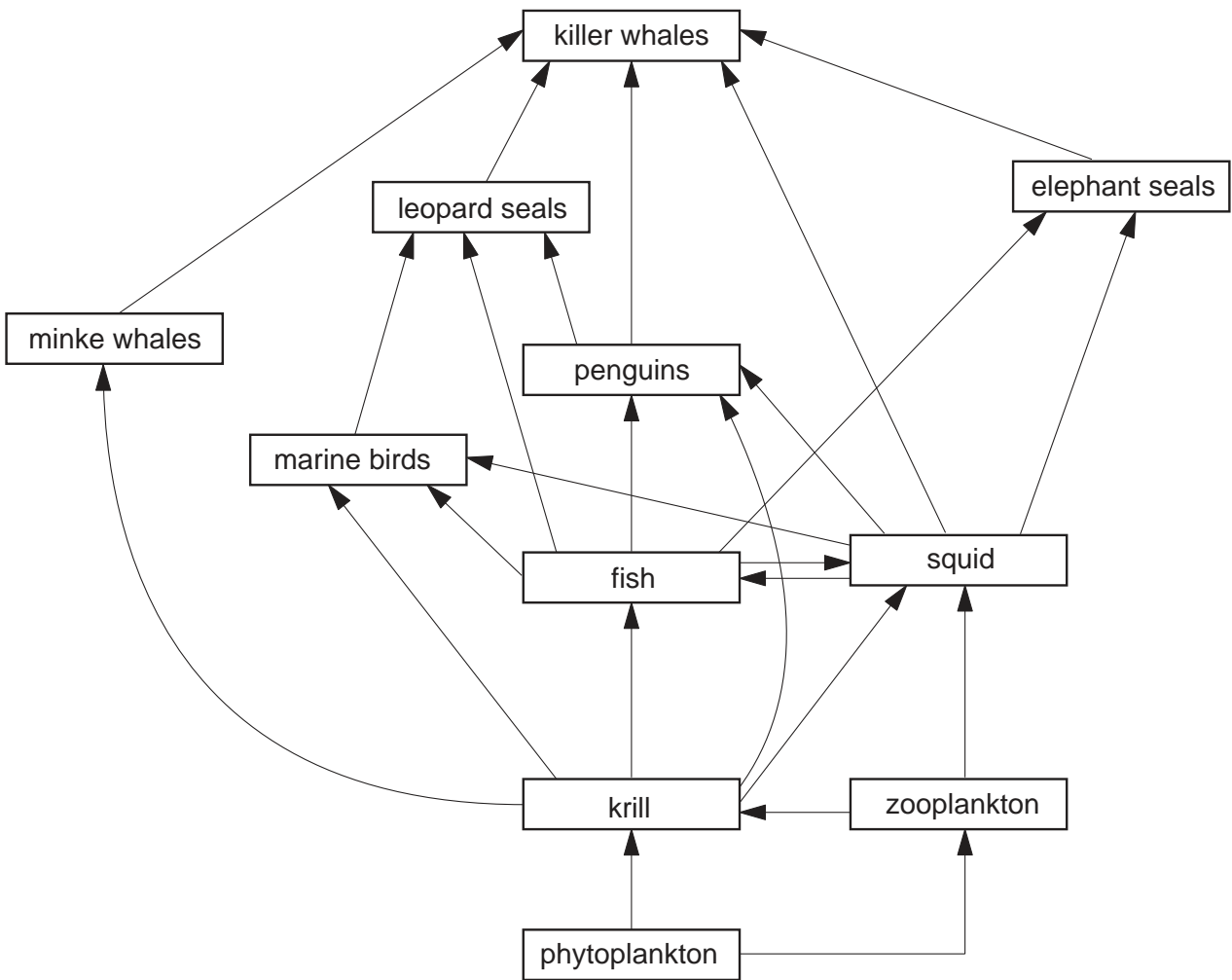


Fig. 1.1

(a) (i) What is the primary source of energy for this food web?

..... [1]

(ii) From the food web, write down a complete food chain that has the least number of trophic levels.

..... [1]

(iii) Explain what the arrows between each organism represent.

.....

 [2]

(iv) Draw a pyramid of biomass for the food chain –

phytoplankton → krill → fish → penguins → killer whales

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[2]

(b) Suggest why a drop in the numbers of leopard seals is unlikely to affect the population of killer whales.

.....
..... [1]

(c) Fig.1.2 shows the relative amounts of energy in a food chain.

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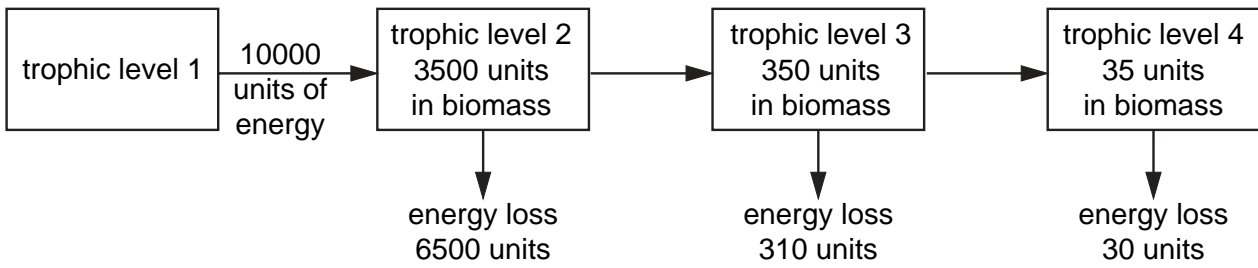


Fig. 1.2

(i) Calculate the percentage of the energy input to trophic level 2 that becomes part of the biomass at trophic level 3.

Show your working.

..... [2]

(ii) State **three** ways by which energy is lost from the food chain.

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..... [3]

(d) Fig. 1.3 shows changes in the intensity of light reaching the surface of the Arctic sea over one year.

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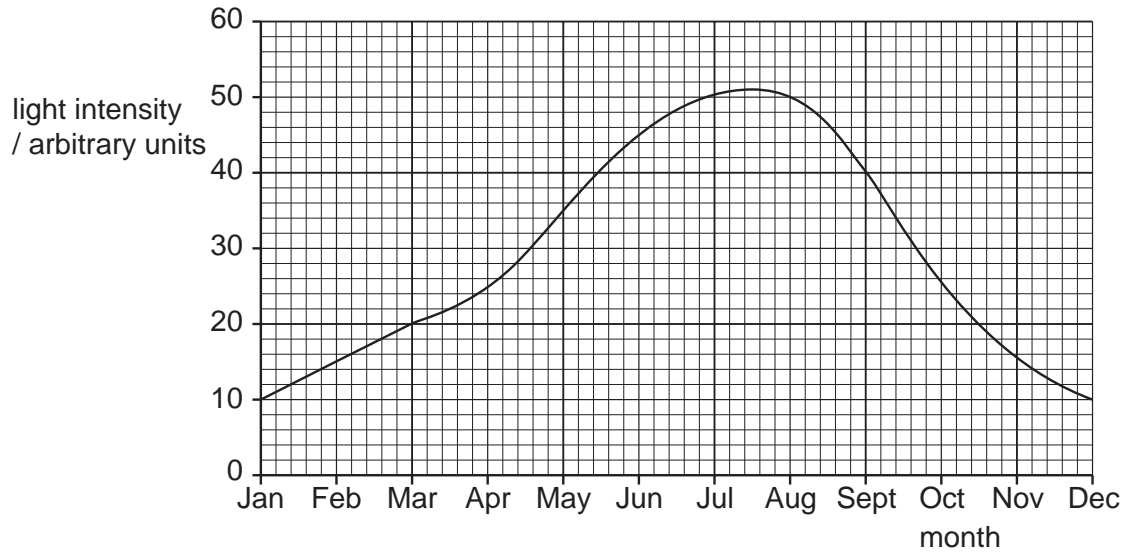


Fig. 1.3

With reference to Fig. 1.3 explain how the productivity of a food web is likely to change over the period September to October.

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[3]

[Total: 15]

2 (a) Explain the meaning of the term *photosynthesis*.

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..... [3]

(b) Explain the meaning of the term *succession*, giving a named example.

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..... [4]

[Total: 7]

3 Fig. 3.1 shows part of the nitrogen cycle in the sea.

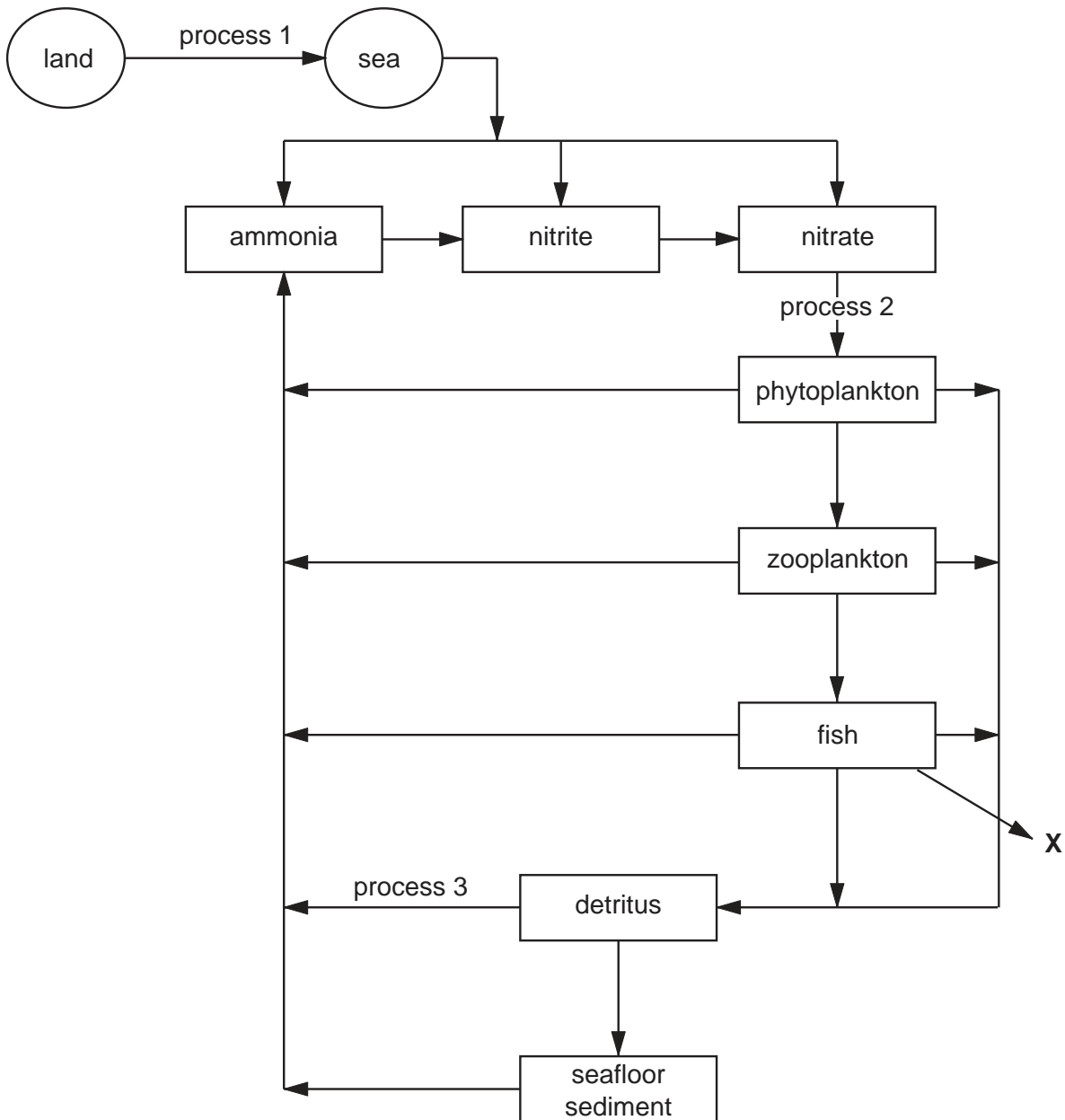


Fig. 3.1

(a) (i) Name processes 1 and 2.

process 1

process 2 [2]

(ii) Explain how phytoplankton make use of nitrates.

.....

..... [1]

(iii) Suggest the group of organisms involved in process 3.

..... [1]

(iv) What takes place at X?

..... [1]

(b) Fig. 3.2 shows the changes in the concentrations of ammonia, nitrite and nitrate in a tank of seawater containing plants and fish.

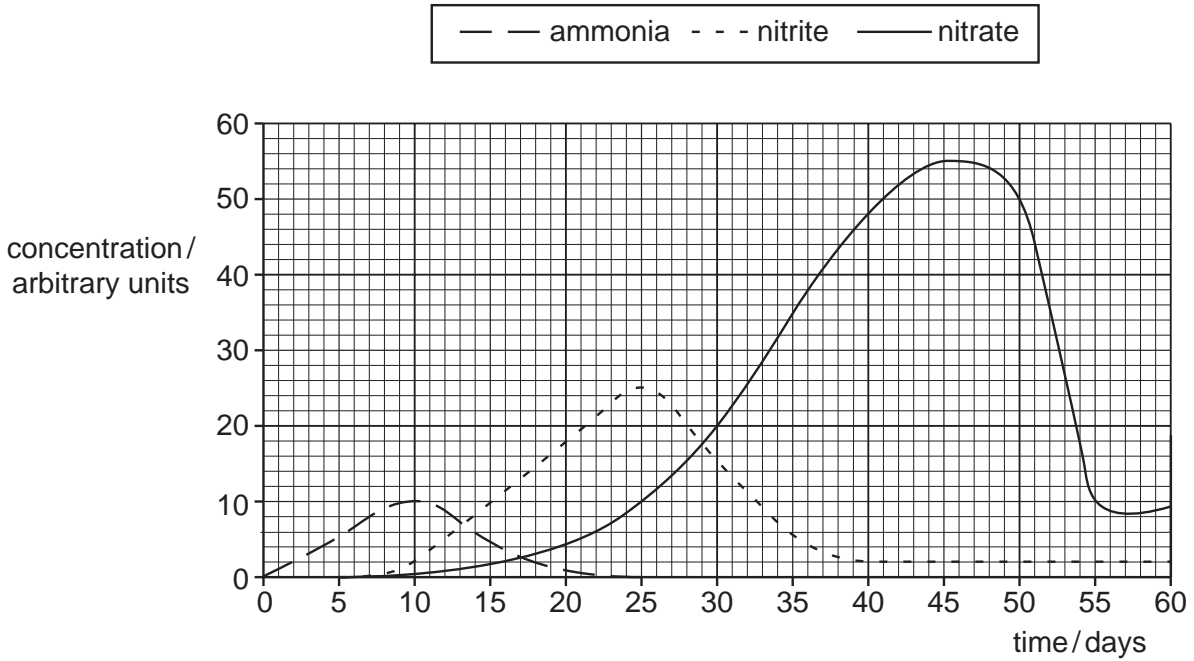


Fig. 3.2

Using the information in Fig. 3.1 and Fig. 3.2,

(i) describe and explain the changes in the concentration of ammonia between day 0 and day 20,

.....

 [3]

(ii) describe and explain the changes in the concentrations of nitrite and nitrate from day 25 to day 45,

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..... [3]

(iii) suggest a reason for the rapid fall in the concentration of nitrate after day 45.

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..... [1]

[Total: 12]

4 (a) Describe the Darwin-Dana-Daly theory of atoll formation.

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(b) Name **three** methods used for the reconstruction of the history of coral reefs.

1

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3 [3]

(c) Suggest **three** reasons for the use of artificial reefs.

1

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..... [3]

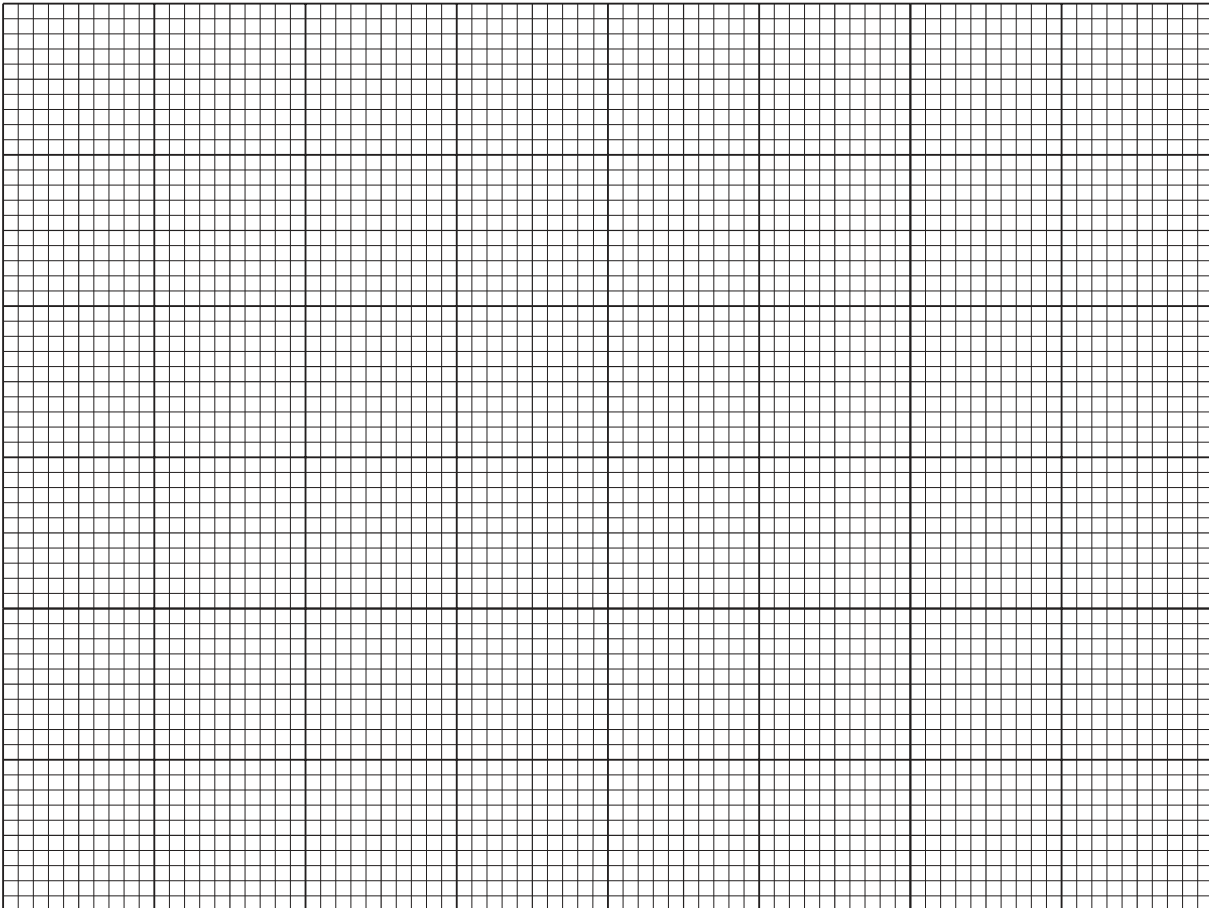
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- 5 (a) Table 5.1 gives the concentrations of four ions present in sea water and fresh water. The concentrations are expressed as a percentage of the total ion content.

Table 5.1

ion	percentage of total ion content		difference in percentage concentration
	sea water	fresh water	
sodium	30.4	7.4	23.0
sulfate	7.8	20.8	13.0
chloride	55.0	9.0	46.0
hydrogencarbonate	0.2	30.2	30.0

- (i) Plot a bar chart of the differences in the percentage concentrations of these four ions.



[4]

(ii) State and explain three factors that affect the chemical composition of sea water.

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(b) Fig. 5.2 shows the maximum and minimum recorded levels of salinity in the surface water of the Pacific Ocean over a year.

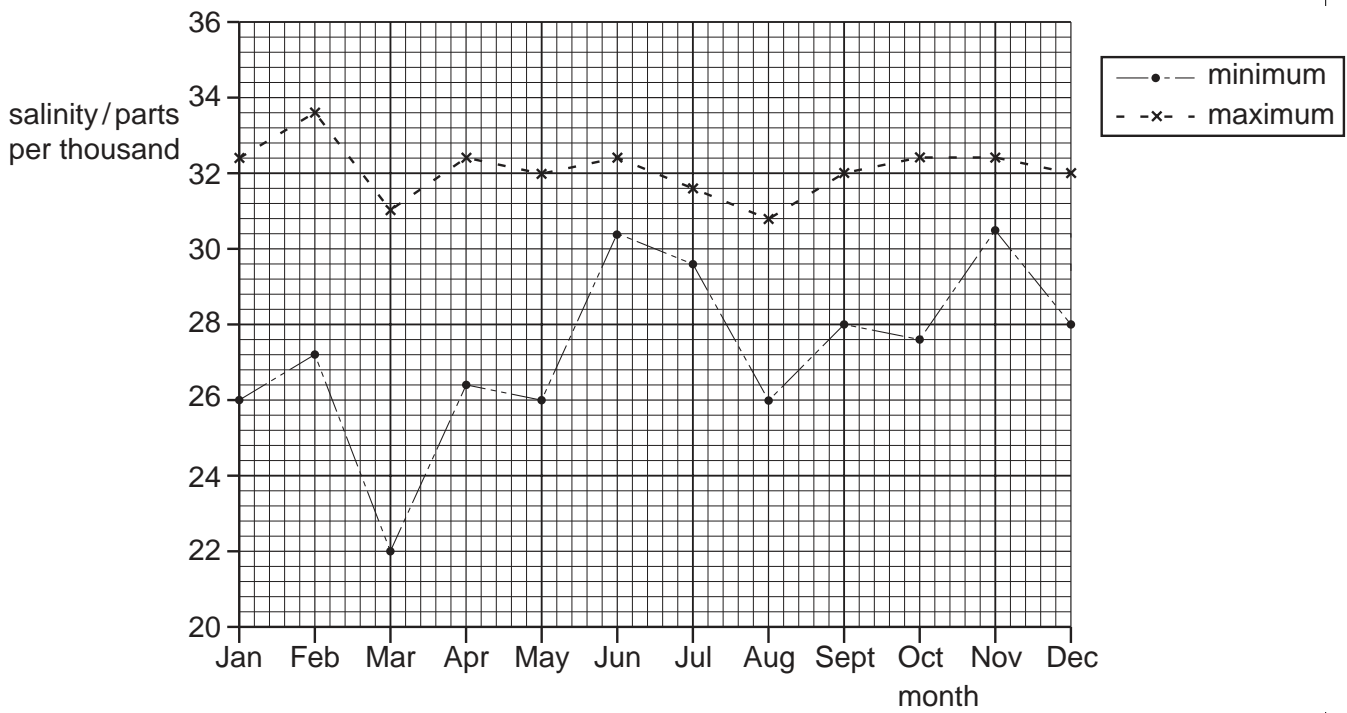


Fig. 5.2

(i) Use Fig. 5.2 to find the difference between the maximum and minimum recorded salinity in January.

..... [2]

(ii) Suggest **two** explanations for the large change in salinity between February and March.

1

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..... [4]

[Total: 16]

6 Fig. 6.1 shows changes in the percentage cover of coral and the relative numbers of Crown of Thorns starfish on one part of the Great Barrier Reef over a 50 year period.

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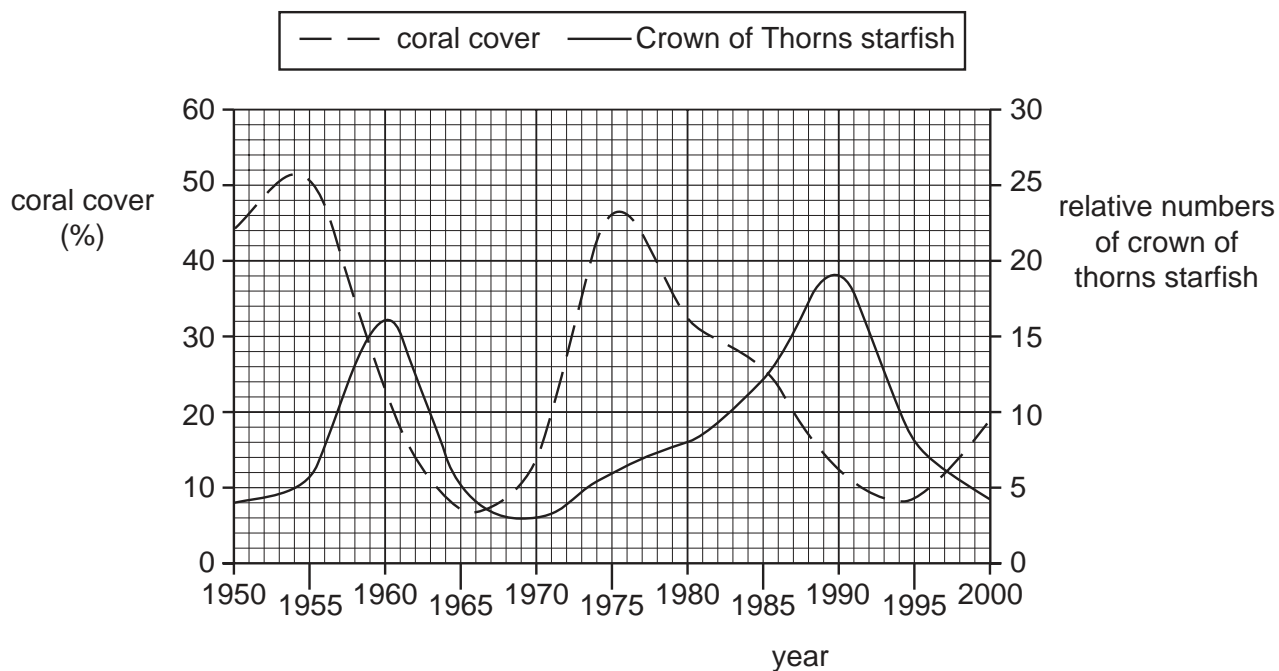


Fig. 6.1

(a) (i) Use Fig. 6.1 to find the difference between the maximum and minimum relative numbers of Crown of Thorns starfish.

..... [1]

(ii) Calculate the rate of increase of coral cover between 1970 and 1975.
Show your working.

..... [2]

(iii) Describe the relationship between the coral and the Crown of Thorns starfish and suggest an explanation for this relationship.

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(iv) Suggest how the data for the Crown of Thorns starfish may have been collected.

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(b) Explain the meaning of the term *parasitism*, giving a named example.

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..... [4]

[Total: 15]

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