



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

CANDIDATE  
NAME

CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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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	
<b>Total</b>	

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



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

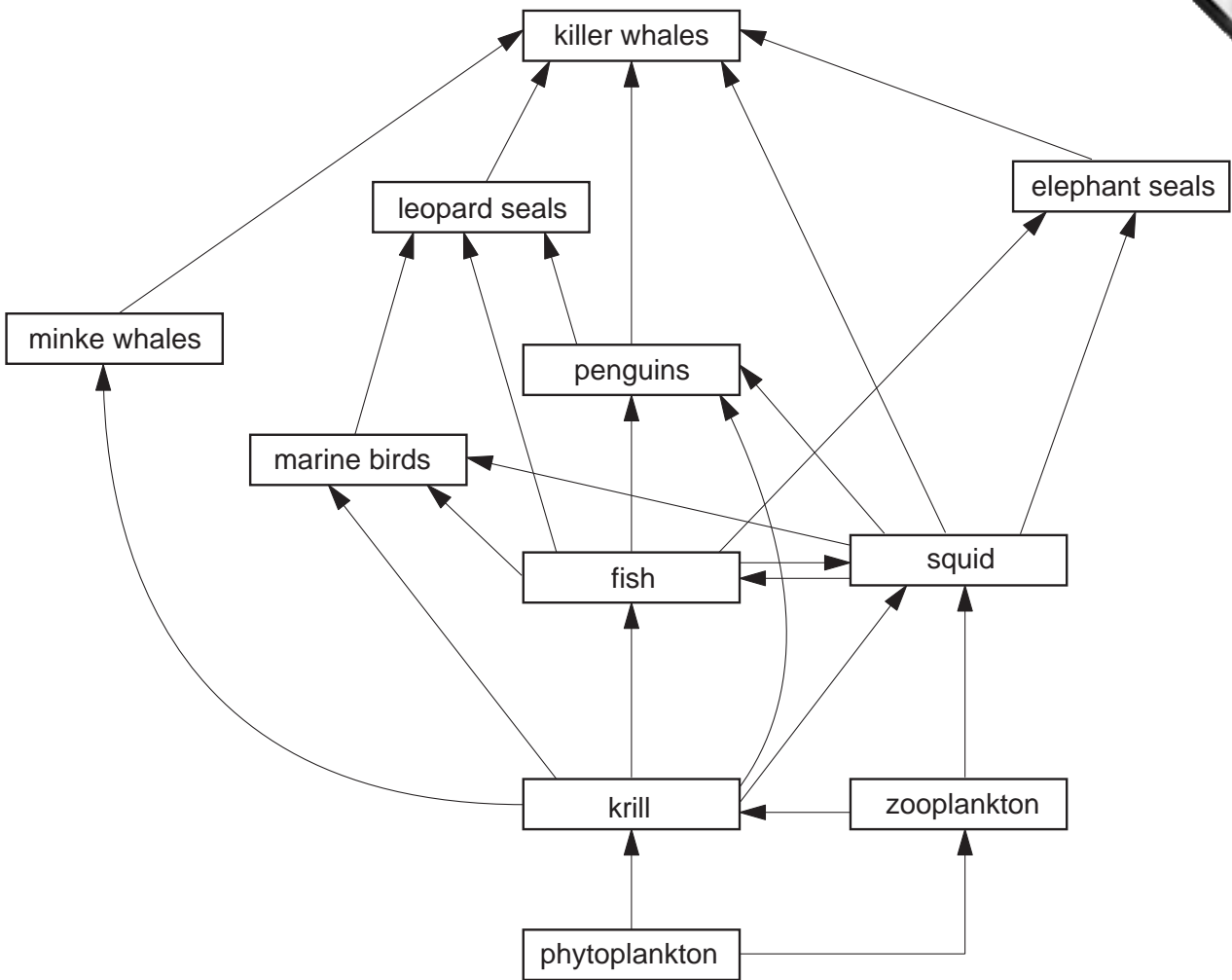
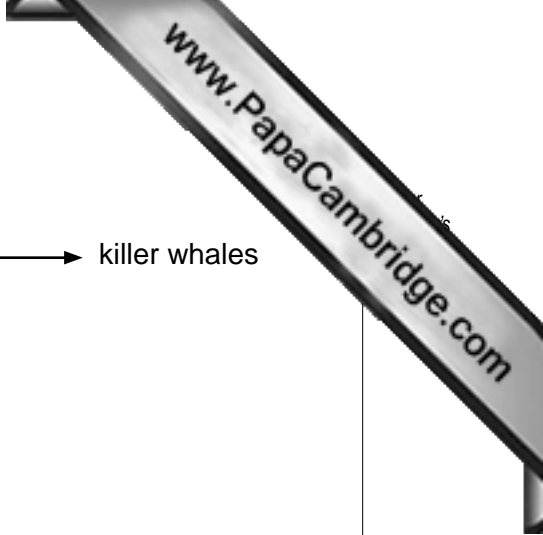
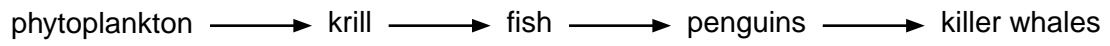


Fig. 1.1

- (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 –



[2]

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

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..... [1]

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

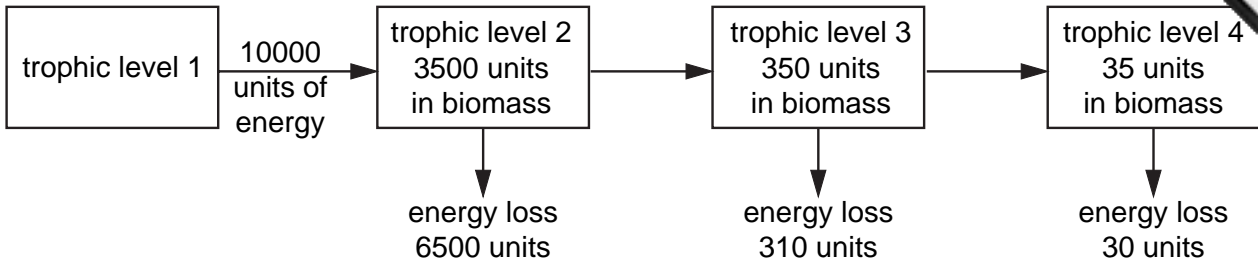


Fig. 1.2

(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.

1 .....

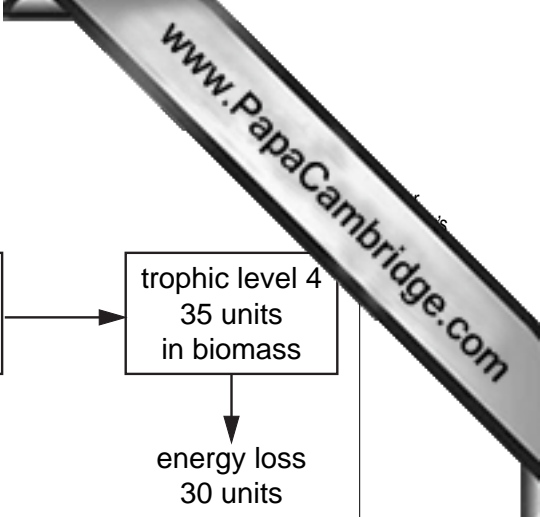
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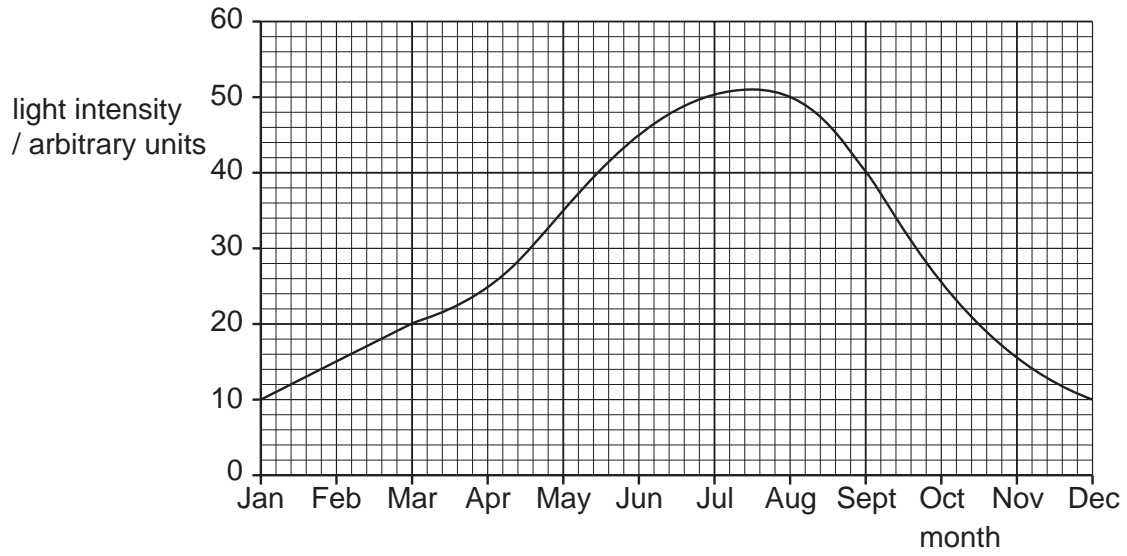
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3 .....

..... [3]



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



**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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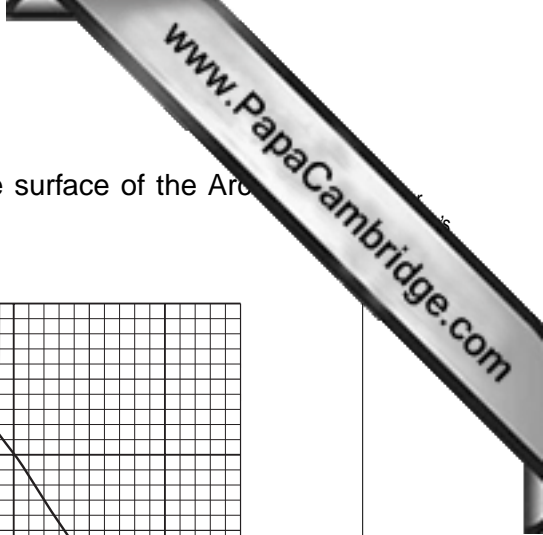
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[3]

[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.

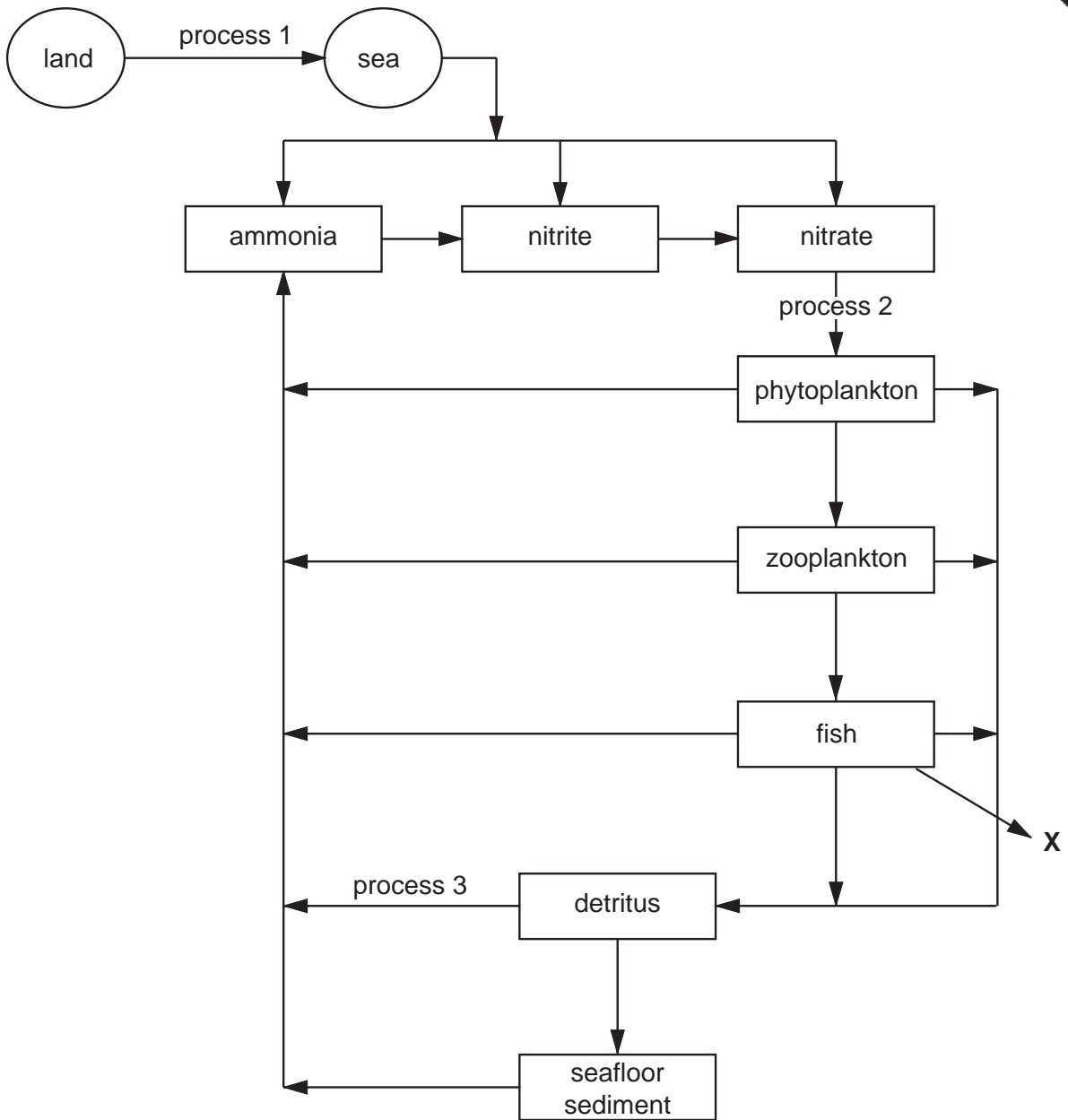


Fig. 3.1

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

process 1 .....

process 2 ..... [2]

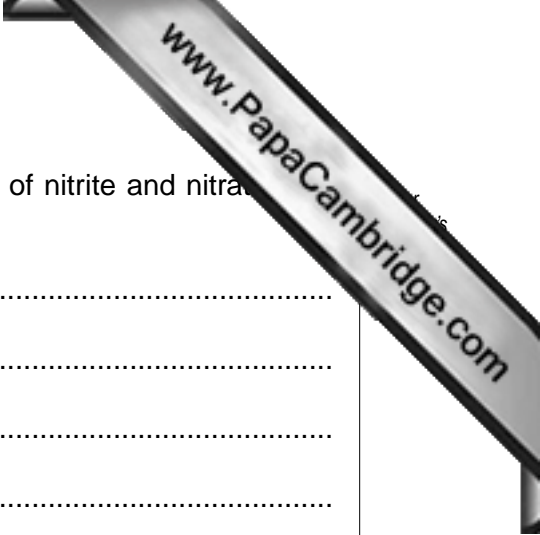
(ii) Explain how phytoplankton make use of nitrates.

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..... [1]







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

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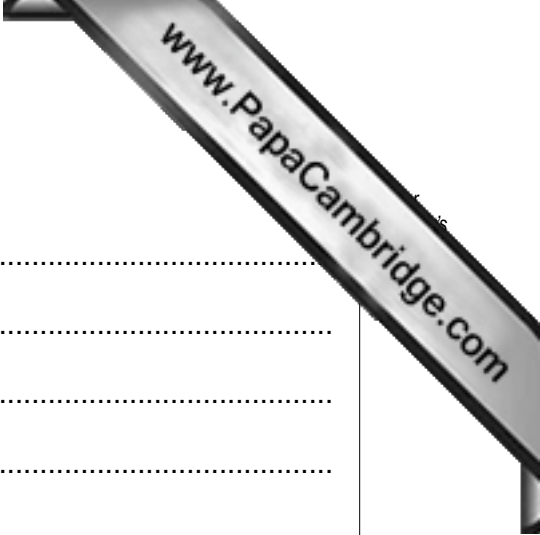
..... [3]

(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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..... [4]

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

1 .....  
2 .....  
3 ..... [3]

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

1 .....  
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2 .....  
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3 .....  
..... [3]

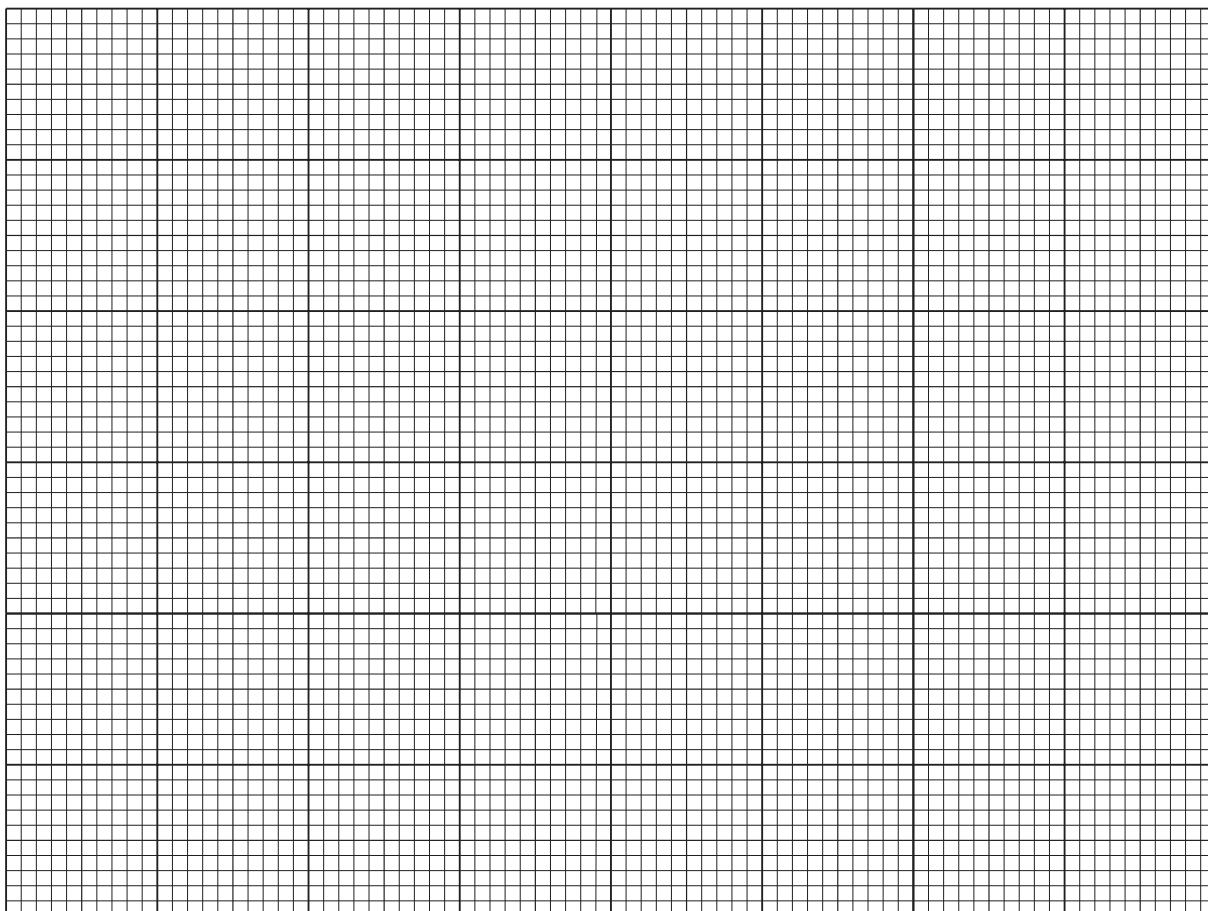
[Total: 10]

- 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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..... [6]

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

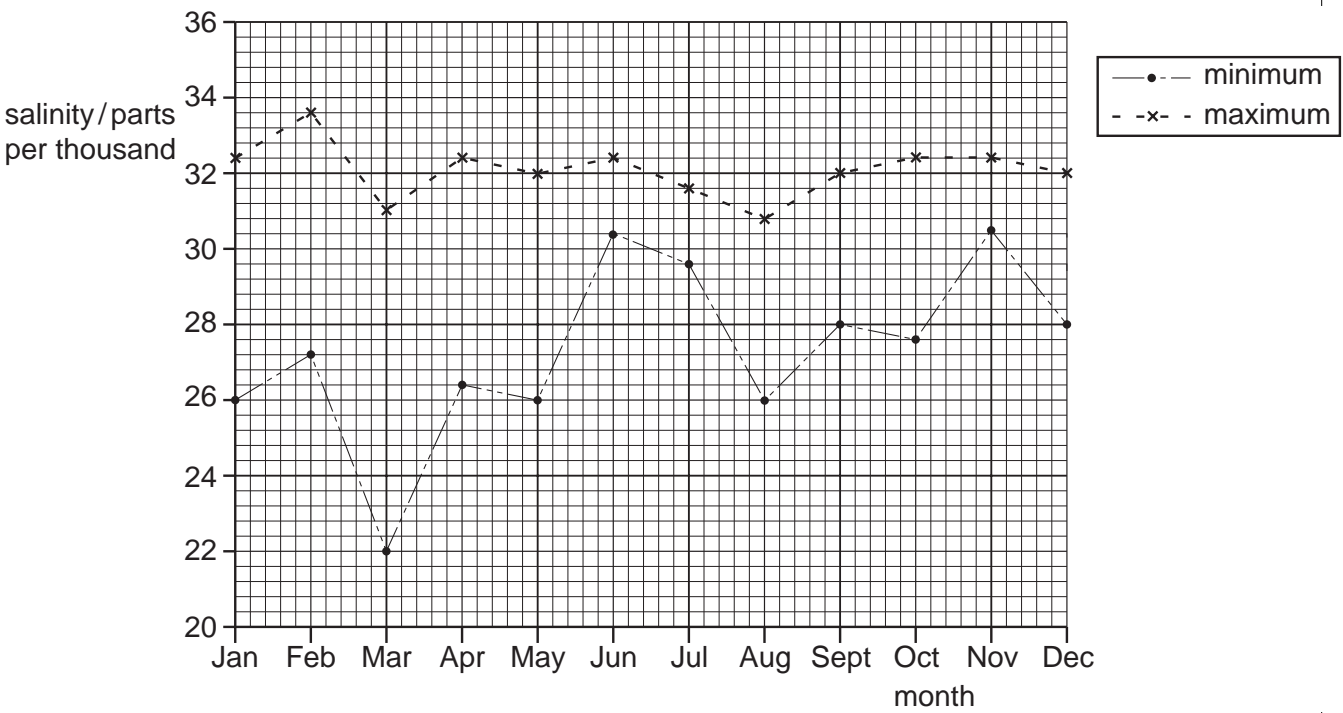
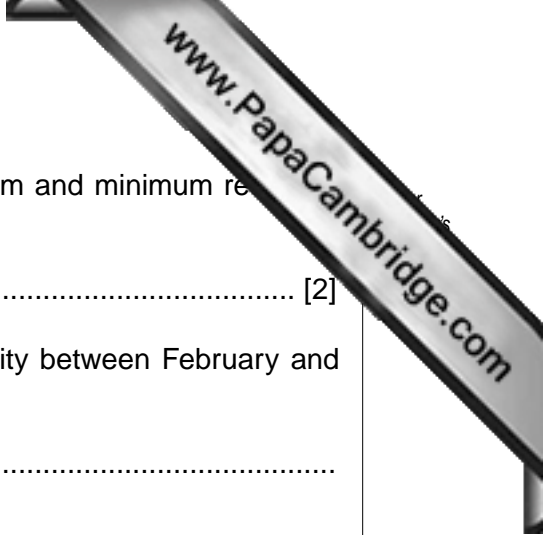


Fig. 5.2



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

..... [2]

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

1 .....

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2 .....

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..... [4]

[Total: 16]

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

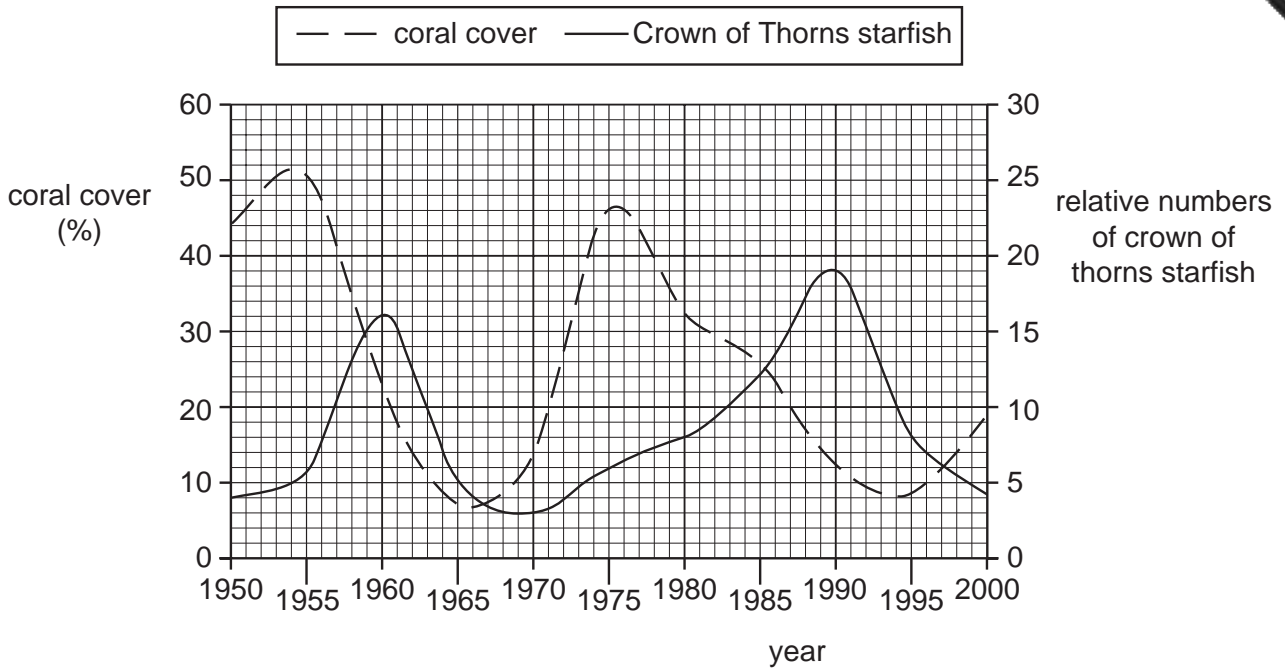


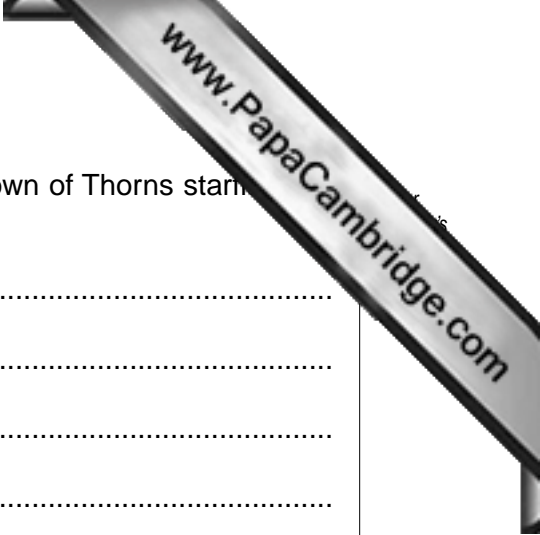
Fig. 6.1

(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. Suggest an explanation for this relationship.

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..... [4]

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

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..... [4]

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

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..... [4]

[Total: 15]

