



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**

Structured Questions  
SPECIMEN PAPER

**For Examination from 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 on both sides of the paper.  
 You may use a soft pencil for any diagrams, graphs or rough working.  
 Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.  
 Write your answers in the spaces provided on the question paper.

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	
<b>1</b>	
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>5</b>	
<b>6</b>	
<b>7</b>	
<b>Total</b>	

This document consists of **17** printed pages and **1** blank page.



1 Fig. 1.1 shows a marine food chain.

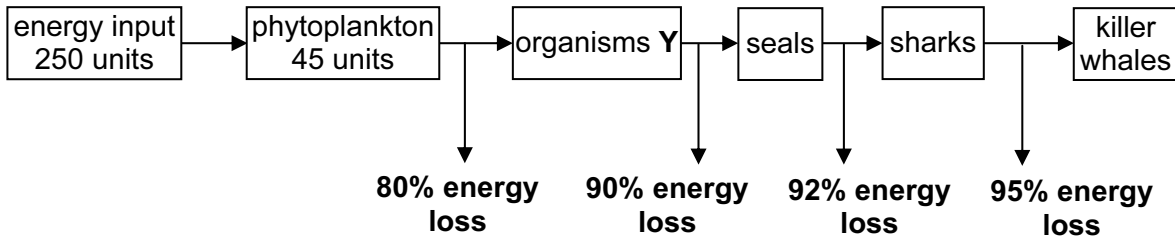


Fig. 1.1

(a) What is the source of the energy input to the food chain?

..... [1]

(b) Suggest the type of organisms labelled Y.

..... [1]

(c) Calculate the percentage of the energy input that is converted into the biomass of the phytoplankton.  
Show your working.

..... [2]

(d) Calculate how many units of energy reach the sharks.

..... [2]

(e) State two ways by which energy is lost from the food chain.

1 .....

2 ..... [2]

(f) Describe the role of photosynthesis in the food chain.

.....  
..... [2]

(g) Fig. 1.2 shows the changes in the biomass of phytoplankton throughout the year in a temperate ocean.

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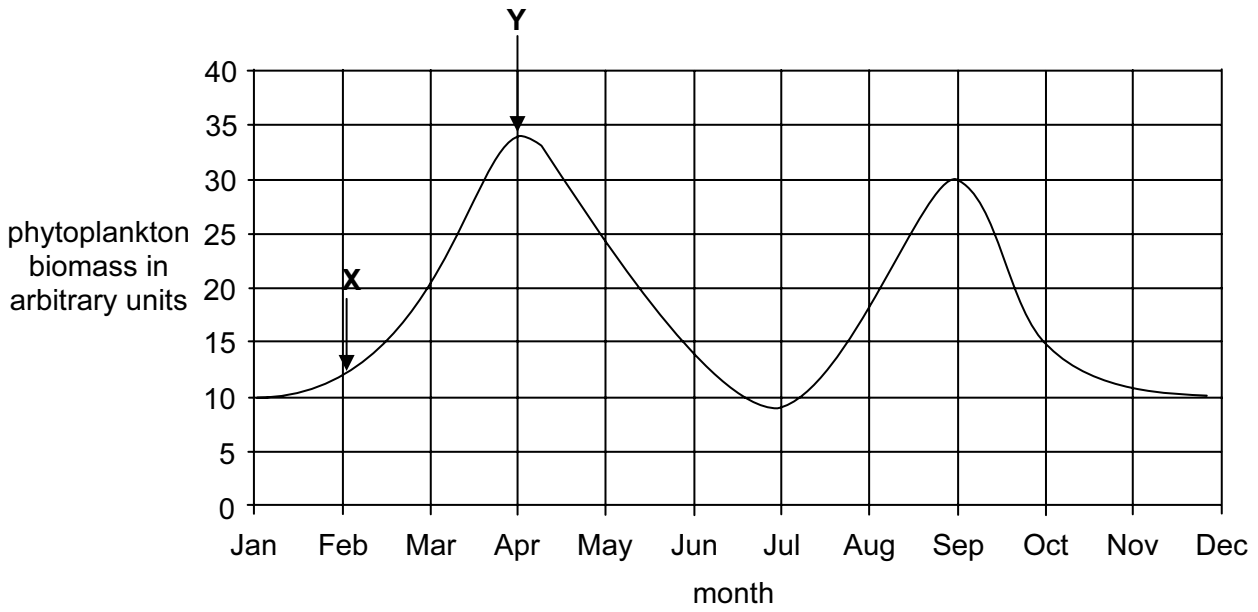


Fig. 1.2

Describe and explain the shape of the graph between points X and Y on the curve.

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..... [4]

[Total: 14]

2 (a) Explain how parasitism and symbiosis differ from each other.

.....  
.....  
.....  
..... [3]

(b) Describe the interrelationship between zooxanthellae and their host.

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..... [4]

(c) Giant tube worms, *Riftia pachyptila*, are found on the ocean floor growing close to hydrothermal vents. These organisms have no mouth or digestive system.

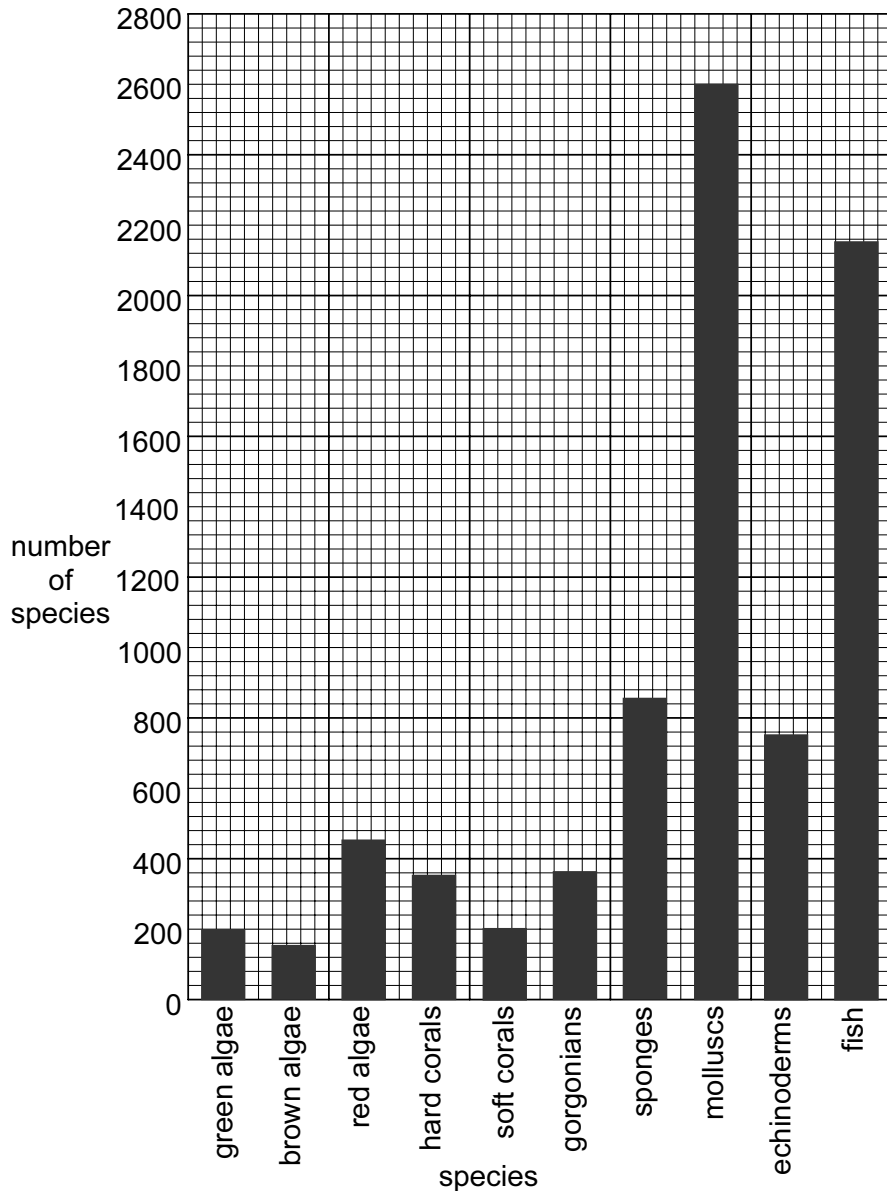
Explain how these tube worms survive in this environment.

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.....  
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.....  
..... [3]

[Total: 10]

- 3 Fig. 3.1 shows the numbers of different species of organisms on the coral reefs of Indonesia in 1996. The data was collected by several different surveys over a period of two years.

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**Fig. 3.1**

- (a) Calculate the percentage of all the species of algae that were red algae.

..... [2]

- (b) The number of different species of sponge in 1996 has been estimated to have fallen by 6.6% from the number of species in 1980.  
Calculate the number of species of sponge in 1980.

..... [2]

(c) Suggest why the data given in the chart may be unreliable.

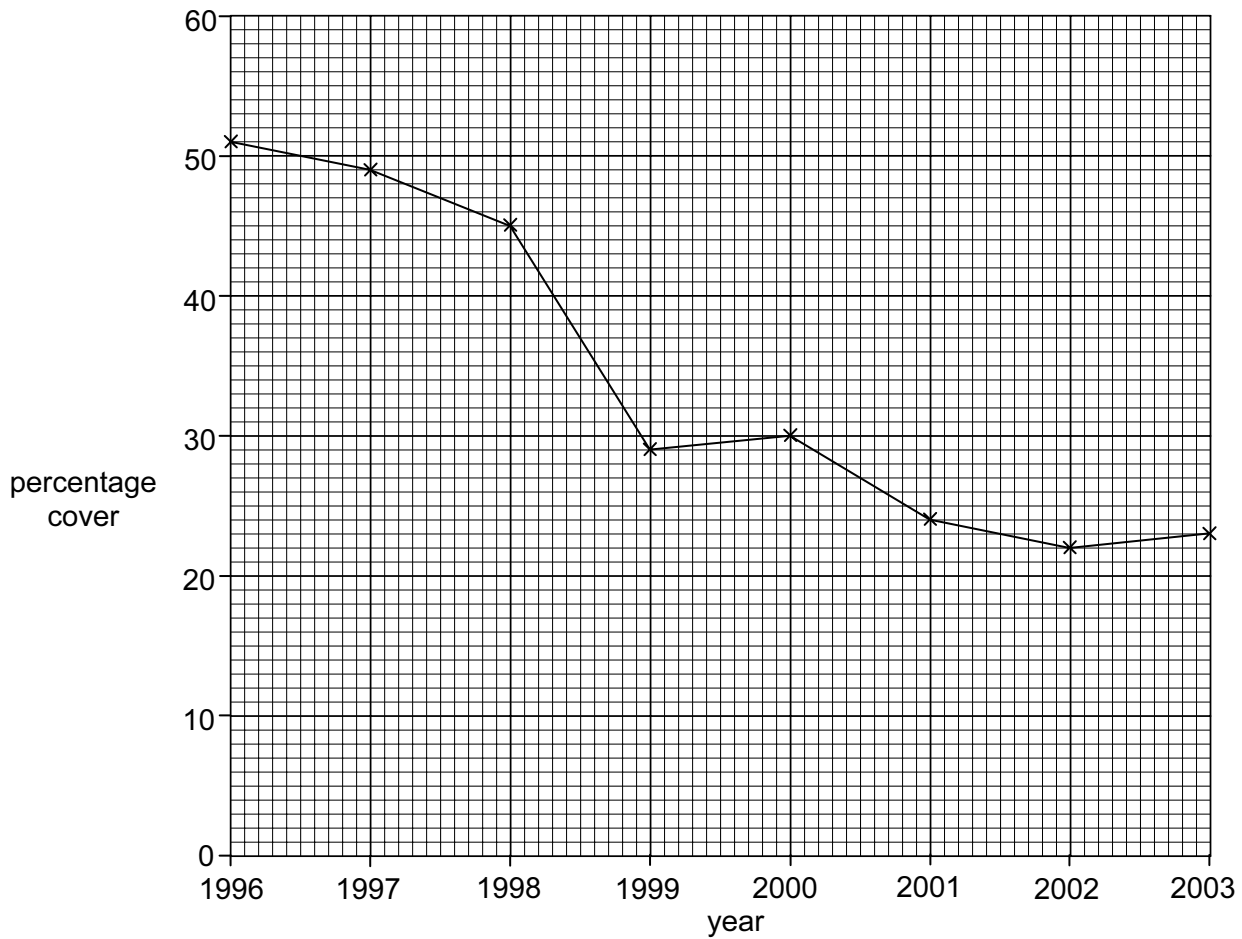
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..... [2]

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(d) Fig. 3.2 shows the changes in the percentage of coral cover on the reefs from 1996 to 2002.



**Fig. 3.2**

(i) Describe the pattern shown in the graph.

.....

.....

.....

..... [3]

(ii) Suggest three reasons for the decline in the percentage of the coral cover of the reef.

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1 .....

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2 .....

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3 .....

..... [3]

**[Total: 12]**

4 (a) Outline briefly the theory of plate tectonics.

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..... [4]

(b) Outline three pieces of evidence for the theory.

1 .....

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2 .....

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3 .....

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..... [3]



(c) Explain how tectonic processes can cause volcanoes.

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..... [3]

**[Total: 10]**

5 (a) Fig. 5.1 shows a section through a black smoker chimney.

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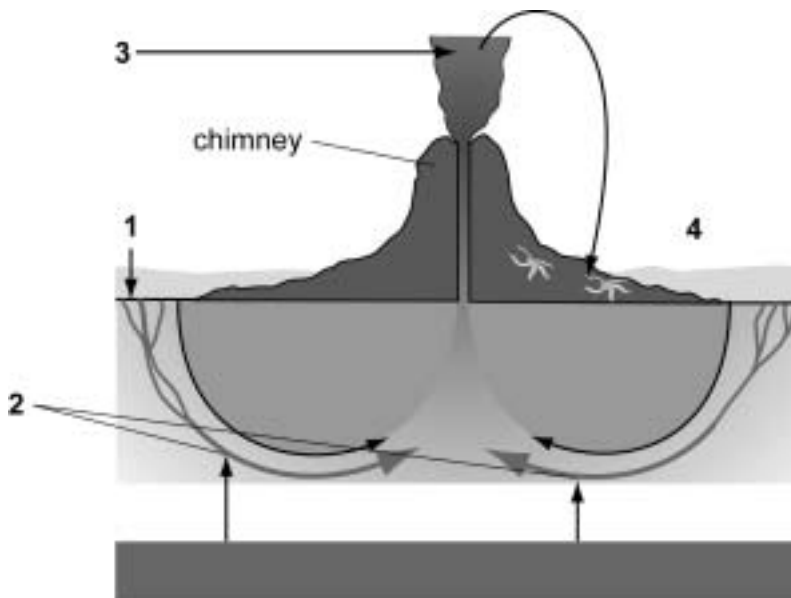


Fig. 5.1

Large bacterial and animal communities have been observed close to these black smokers but no plants are found.

(i) Explain this observation.

.....  
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..... [3]

(ii) Describe the processes taking place at the sites labelled 1 to 4 on Fig. 5.1 and how these lead to the formation of the chimney.

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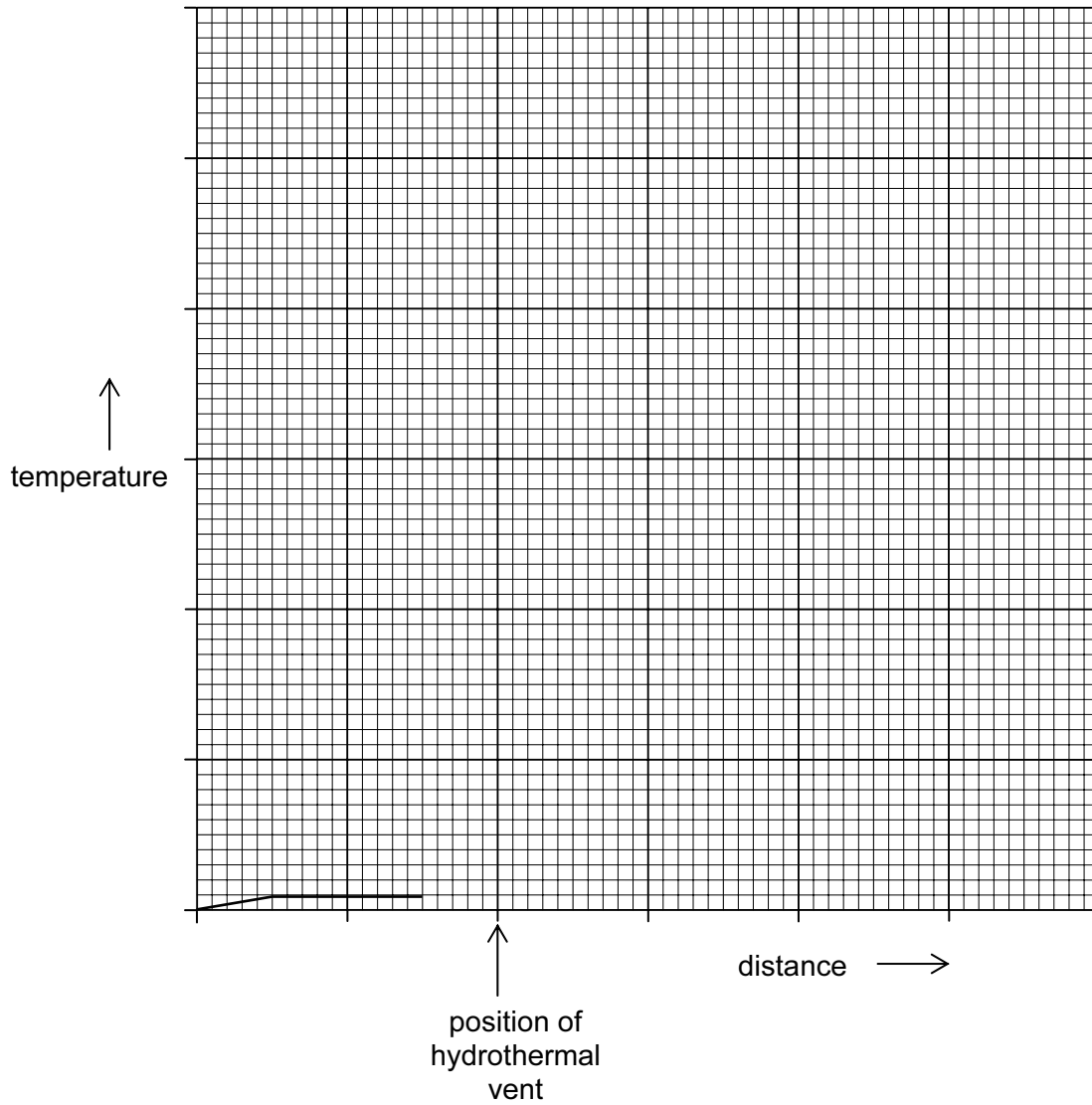
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..... [4]

- (b) Fig. 5.2 shows the relative temperature of seawater close to a hydrothermal vent. Continue the line to show how the temperature of the seawater changes as it passes over the hydrothermal vent.

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Use



**Fig. 5.2**

[3]

**[Total: 10]**

6 (a) By what other name are tropical cyclones known?

..... [1]

(b) Fig. 6.1 shows a section through a tropical cyclone.

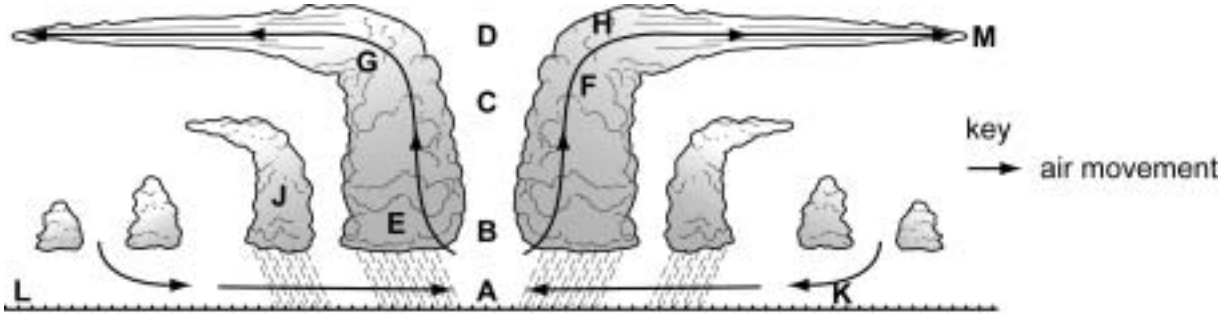


Fig. 6.1

(i) State the minimum temperature at **A**.

..... [1]

(ii) Give the letter of the point at which the winds are strongest.

..... [1]

(iii) Name the process that provides the latent energy for the development of the cyclone.

..... [1]

(iv) State what happens to the air pressure as the air rises from **A** to **D**.

..... [1]

(c) Describe three possible effects of cyclones on coastal communities.

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1 .....

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2 .....

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3 .....

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..... [3]

[Total: 8]

7 (a) Fig. 7.1 shows the phosphorus cycle on land and in the sea.

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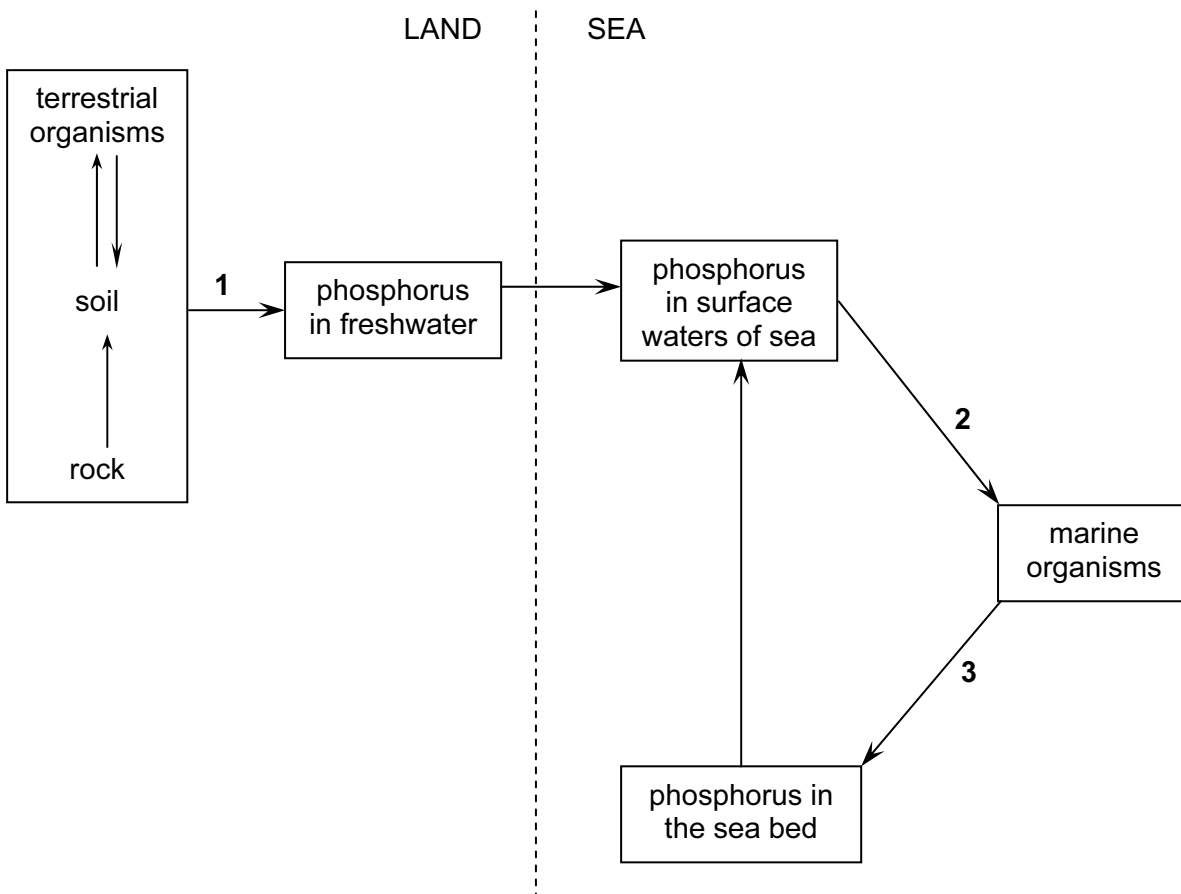


Fig. 7.1

Describe how phosphorus in soil becomes part of the tissues of marine fish.

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[3]

(b) Fig. 7.2 shows the winter concentration of phosphate in the surface water of the Baltic sea from 1970 to 2000.

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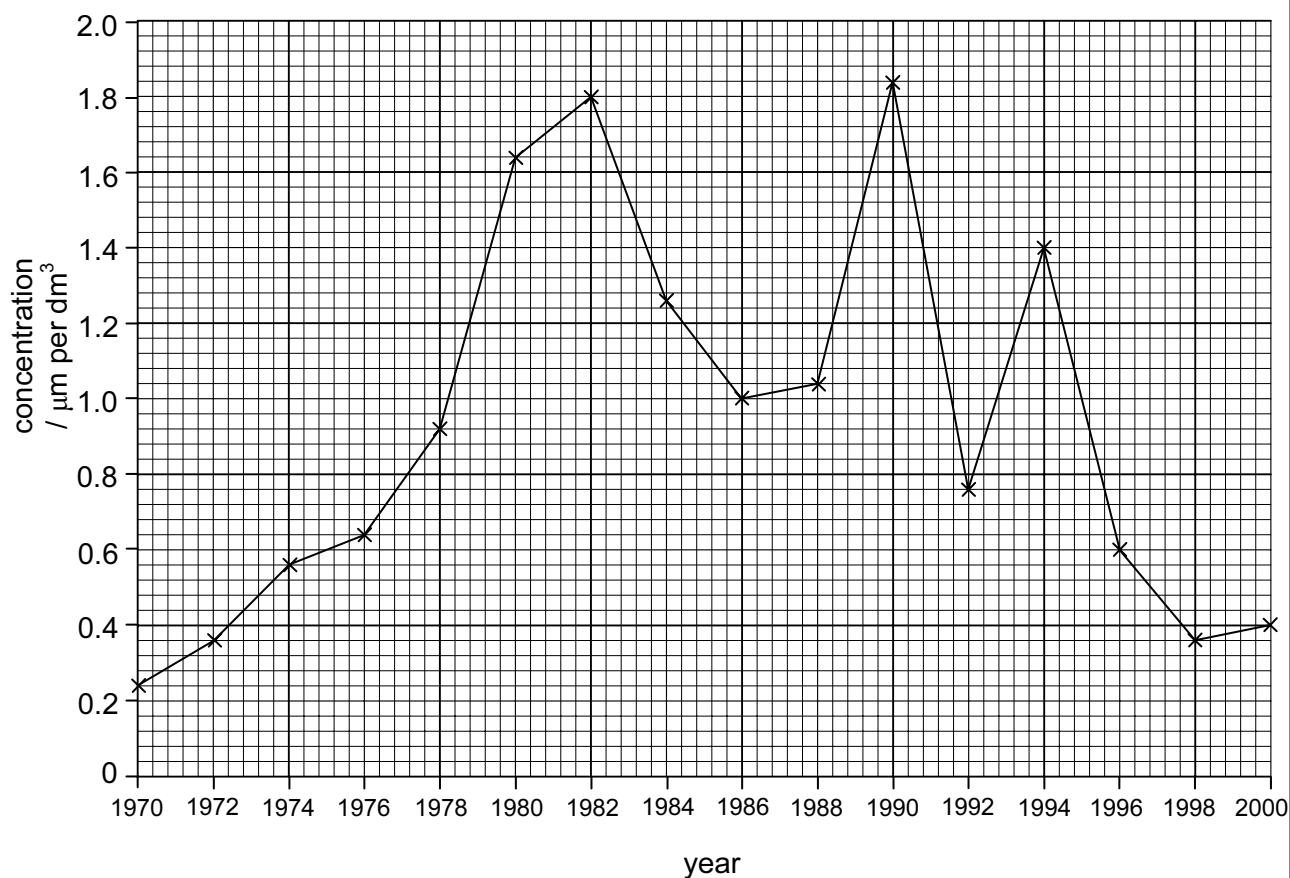


Fig. 7.2

(i) Table 7.1 shows the amounts of phosphate-containing fertiliser used from 1970 to 2000.

Table 7.1

year	phosphate/ tonnes
1970	60 000
1972	72 000
1974	156 000
1976	118 000
1980	84 000
1982	76 000
1984	64 000
1986	56 000
1988	48 000
1990	40 000
1992	36 000
1994	32 000
1996	28 000
1998	28 000
2000	24 000

Plot this data on the graph using an appropriate scale on the right hand axis. [4]



- (ii) Calculate the rate of increase in the phosphate concentration from 1970 to 1982. Show your working.

..... [2]

- (iii) After 1974 the use of fertiliser fell. Explain why the concentration of phosphate in the sea continued to rise.

..... [1]

- (iv) Suggest a reason for the large increase in phosphate concentration from 1992 to 1994.

..... [1]

**[Total: 11]**

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