CANDIDATE
NAME

CENTRE
NUMBER

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NUMBER

MARINE SCIENCE **9693/01**

Paper 1 AS Structured Questions

May/June 2009

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.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

1 **(a)** State what is meant by each of the following terms.

    (i) species

....

....

.... [1]

    (ii) population

....

....

.... [1]

    (iii) community

....

....

.... [1]

    (iv) ecosystem

....

....

.... [1]

(b) **(i)** Explain what is meant by chemosynthesis and photosynthesis.

....

....

....

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....

....

.... [4]

   (ii) Explain why hydrothermal vents are examples of an extreme marine environment.

   ....

   ....

   ....

   .... [3]

[Total: 11]

2 **(a)** State the effect of evaporation on the salinity of seawater.

....

.... [1]

(b) State **three** factors that affect the chemical composition of seawater.

1 ....

2 ....

3 .... [3]

(c) Fig. 2.1 shows how the temperature of seawater varies with depth.
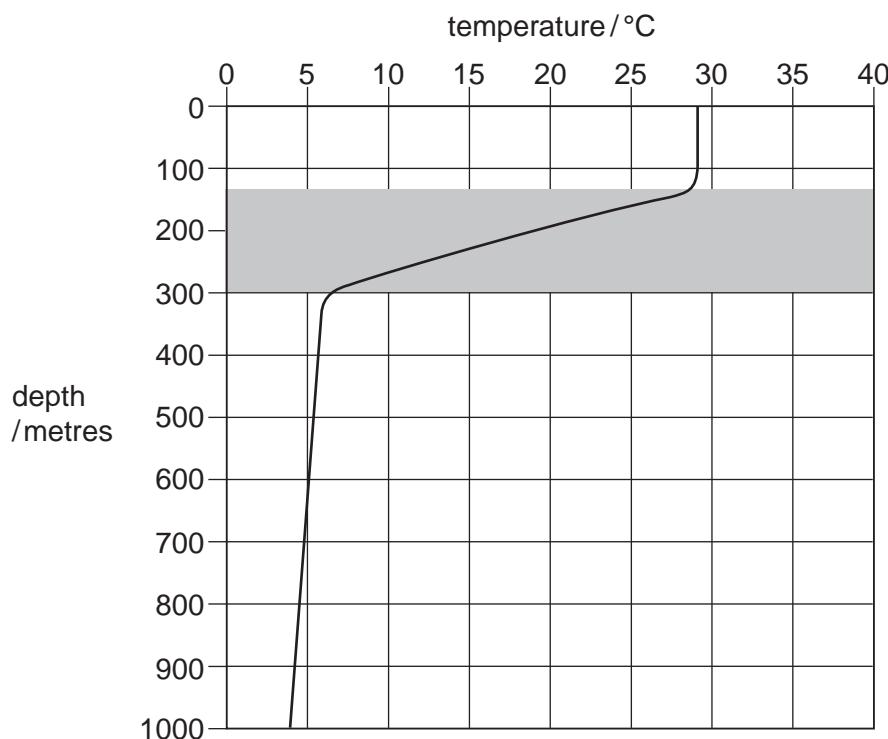
Fig. 2.1

(i) Describe the changes in temperature shown in Fig. 2.1.

....

....

....

....

....

....

.... [4]

   (ii) Name the shaded area shown on Fig. 2.1.

   .... [1]

 **(d)** Table 2.1 shows how the salinity of seawater varies with depth.

Table 2.1

Depth / metres	Salinity / parts per thousand
0	35.5
250	34.9
500	34.4
750	34.3
1000	34.4
1250	34.5
1500	34.6
1750	34.7
2000	34.7
2250	34.8
2500	34.8

   (i) Draw a graph of the data in Table 2.1.   [4]

Salinity/parts per thousand

depth /metres
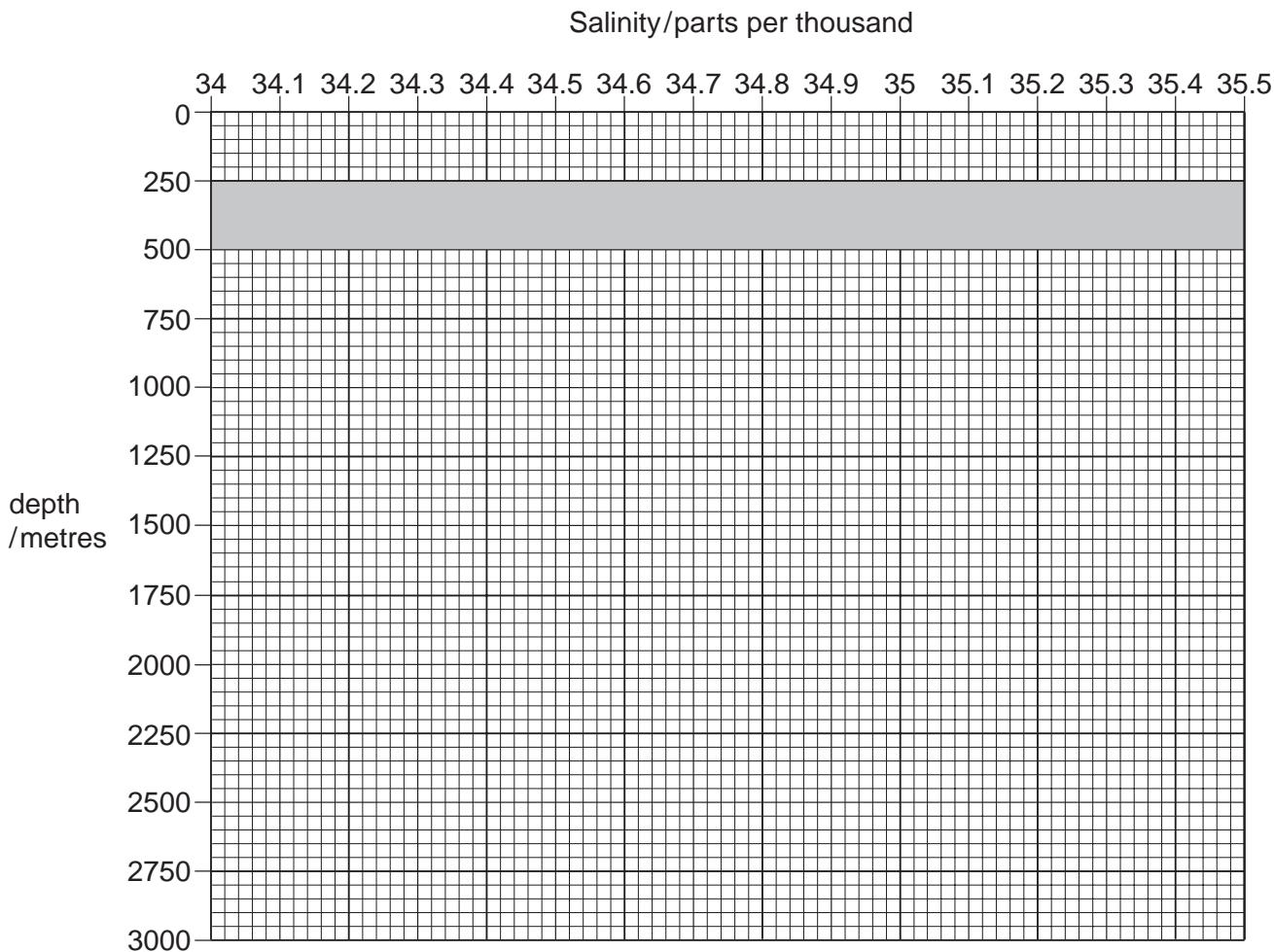
(ii) The shaded area on the graph is known as the *halocline*.

Describe what happens to the salinity in the halocline.

....

....

.... [2]

[Total: 15]

3   **(a)** Fig. 3.1 shows a marine food web.
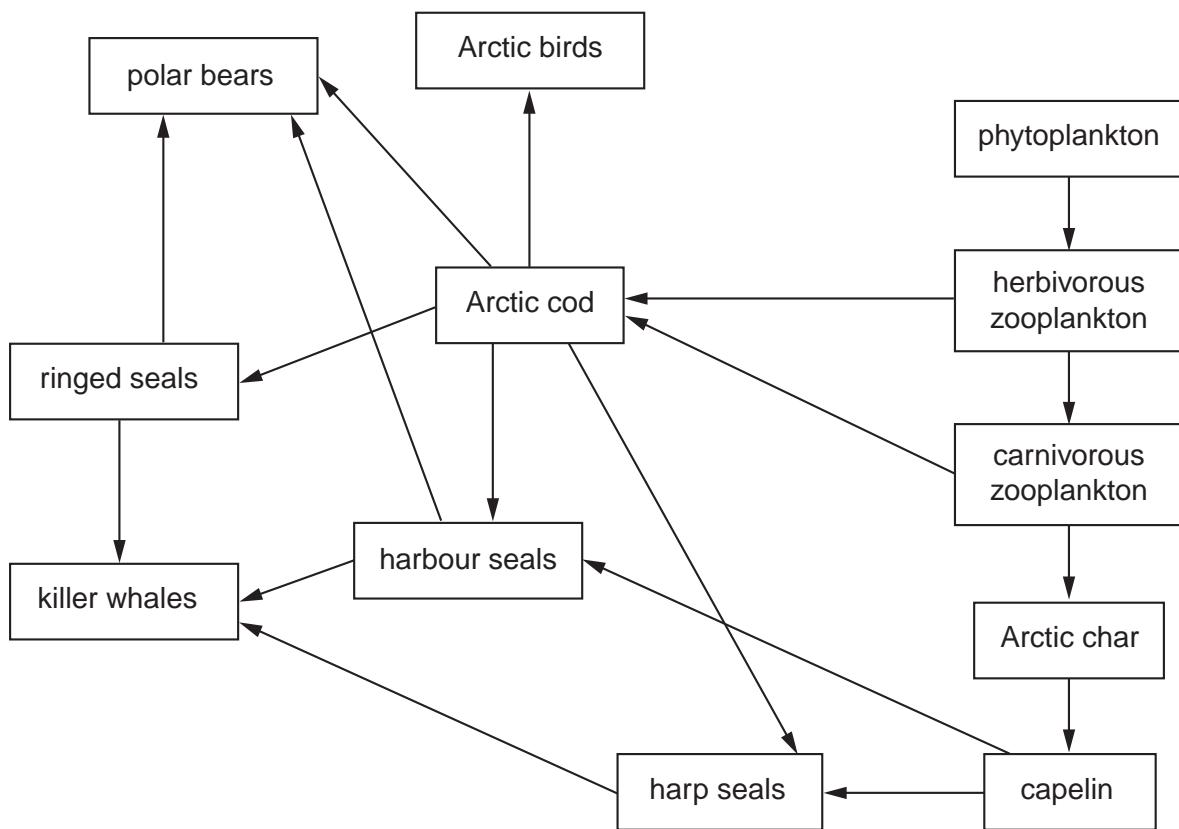
**Fig. 3.1**

Explain what is meant by each of the following terms, giving an example from Fig. 3.1.

   (i) predator

   ....

   ....

   .... [2]

   (ii) trophic level.

   ....

   ....

   .... [2]

(b) **(i)** State the number of species in Fig. 3.1 that feed on Arctic cod.

   .... [1]

   (ii) Suggest **one** factor, other than predation, that may affect the Arctic cod population.

   ....

   .... [1]

(c) Suggest why it is advantageous for a carnivore to feed on more than one type of organism.

....

.... [1]

(d) Fig. 3.2 shows the changes in the numbers of three species of fish from 1960 to 2000.
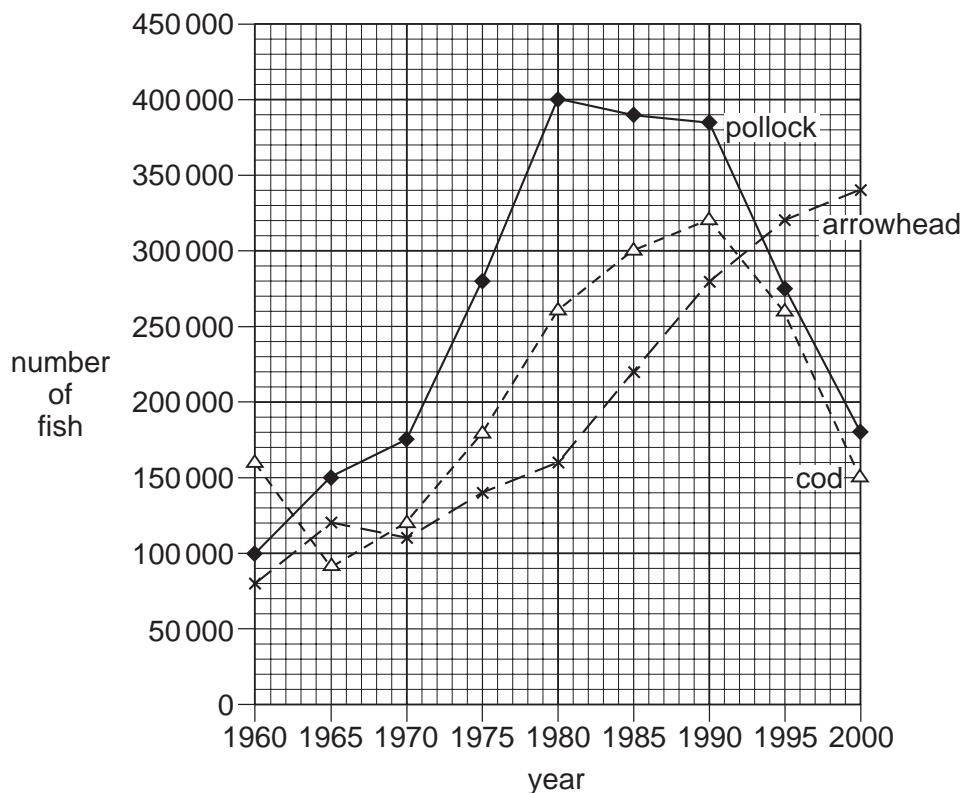
Fig. 3.2

 (i) Describe the changes in the number of pollock from 1960 to 2000.

 ....

 ....

 ....

 ....

 ....

 ....

 .... [3]

9

(ii) Cod feed on pollock.

Describe how the data in Fig. 3.2 supports this statement.

....

....

....

.... [2]

(iii) Suggest why the number of arrowhead continue to increase when the number of pollock falls.

....

.... [1]

[Total: 13]

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4 (a) (i) Suggest how sedimentation can reduce coral growth.

....

....

....

....

....

.... [3]

(ii) Suggest how an increase in carbon dioxide in the atmosphere can damage coral.

....

....

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....

....

.... [3]

**(b)** Fig. 4.1 shows the depth of water around an island and the positions of twenty artificial reefs.
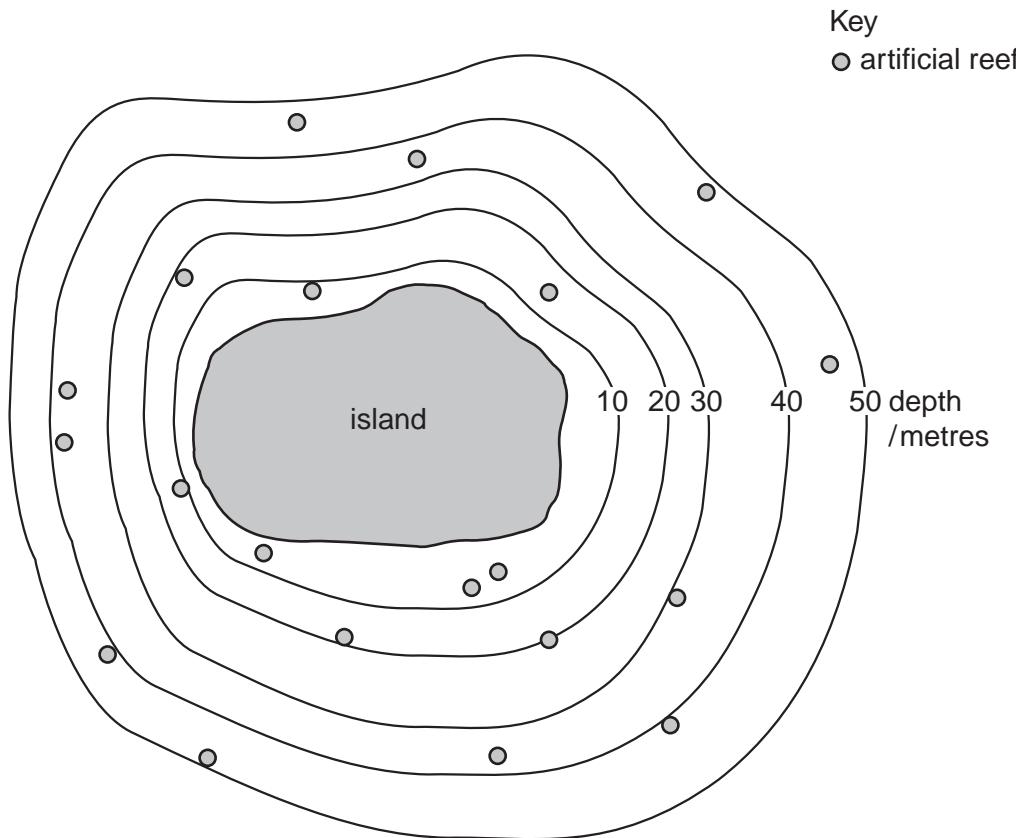
Fig. 4.1

State the percentage of the reefs that are

(i) less than 20 metres deep

.... [1]

(ii) 40 metres or more deep.

.... [1]

(c) Table 4.2 shows the types of material used to construct some of these artificial reefs.

Table 4.2

reef number	construction material
1	stone pipes and concrete blocks
2	steel pipes
3	steel tower
4	stone pipes and concrete blocks
5	stone rubble and steel pipes
6	concrete blocks
7	steel balls and steel pipes
8	steel pipes and bridge rubble
9	iron and steel railway engine
10	concrete telephone poles
11	stone pipes
12	steel pipes
13	concrete boxes
14	concrete blocks
15	steel girders

(i) State the **two** types of material that were used most often.

1 ....

2 .... [2]

(ii) Suggest **two** reasons why these materials were used.

1 ....

....

2 ....

.... [2]

(d) State **three** reasons for the use of artificial reefs.

1 ....

....

....

2 ....

....

....

3 ....

....

.... [3]

[Total: 15]

5 **(a)** Define the term *littoral zone*.

....

.... [1]

(b) Describe **two** processes that affect the shape of a sandy shore.

1 ....

....

....

....

2 ....

....

....

.... [4]

(c) Outline the environmental factors affecting organisms living on a rocky sea shore.

....

....

....

....

....

....

....

.... [4]

[Total: 9]

 [Turn over

6 **(a)** Explain how tides are caused.

....

....

....

....

....

....

....

....

.... [5]

(b) **(i)** Explain what is meant by the term *tidal range.*

....

.... [1]

(ii) State **three** factors that affect the tidal range.

1 .... [1]

2 .... [1]

3 .... [1]

(c) Table 6.1 shows the tide tables for a coastal region over five days in January 2007.

day	time of day	high or low tide	height / metres
1	01:14	high	13.9
	07:31	low	1.1
	13:35	high	14.5
	20:00	low	0.8
2	02:04	high	14.1
	08:21	low	0.9
	14:25	high	14.7
	20:49	low	0.5
3	02:54	high	14.3
	09:11	low	0.8
	15:16	high	14.6
	21:38	low	0.5
4	03:45	high	14.3
	10:02	low	
	16:08	high	14.4
	22:29	low	0.6
5	04:37	high	14.1
	10:54	low	1.0
	17:02	high	14.0
	23:21	low	0.9

(i) State the difference in height between the highest and lowest tides on day 5.

.... [1]

(ii) State the time difference between the two high tides on day 2.

.... [1]

(iii) Suggest a height for the low tide at 10:02 on day 4.

.... [1]

[Total: 12]

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