



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

CANDIDATE  
 NAME

CENTRE  
 NUMBER

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**MARINE SCIENCE**

**9693/01**

Paper 1 AS Structured Questions

**May/June 2013**

**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.

Electronic calculators may be used.

This document consists of **14** printed pages and **2** blank pages.



1 (a) Explain what is meant by each of the following terms used in ecology.

(i) habitat .....  
..... [1]

(ii) community .....  
.....  
.....  
..... [2]

(b) Table 1.1 shows the range of particle sizes found on two different types of shore.

**Table 1.1**

<b>type of shore</b>	<b>particle diameter /mm</b>
sandy	0.02 to 2.0
muddy	0.002 to 0.2

(i) Compare the particle sizes of the sandy shore and the muddy shore.  
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.....  
.....  
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.....  
..... [3]

(ii) Explain how the process of sedimentation gives rise to a muddy shore.  
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..... [3]

(iii) Using the information in Table 1.1 and your own knowledge, explain why a rocky shore tends to have a higher biodiversity than a sandy shore.

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Examiner's  
Use*

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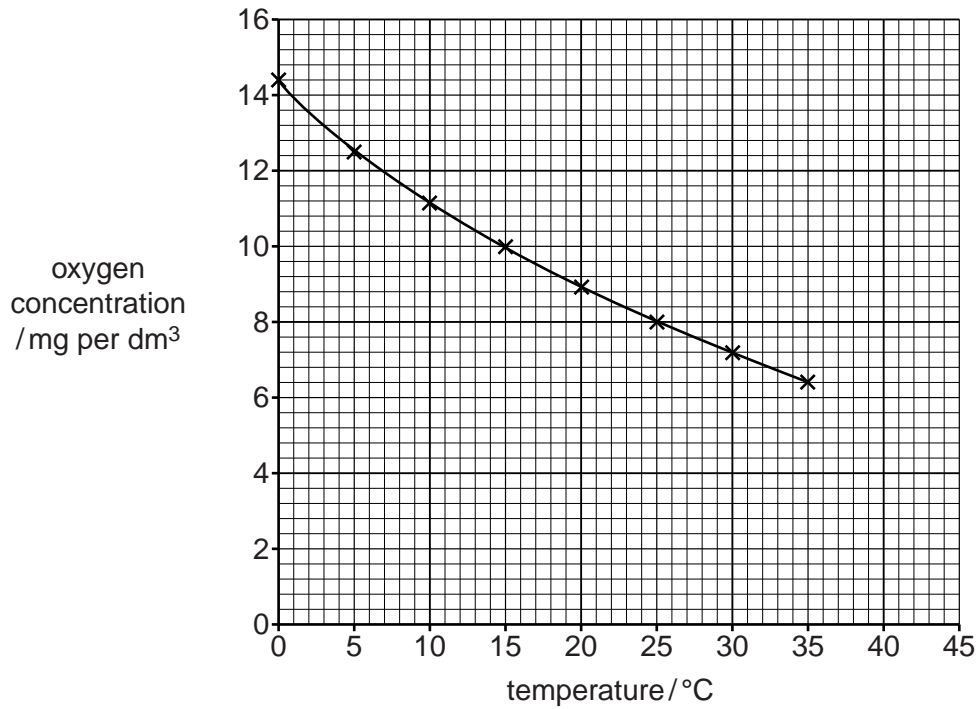
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..... [4]

[Total: 13]

- 2 (a) Fig. 2.1 shows the oxygen concentration at different temperatures in fresh water.



**Fig. 2.1**

- (i) State the change in oxygen concentration between 5 °C and 15 °C.  
 ..... [2]
- (ii) Use Fig. 2.1 to estimate the oxygen concentration at a temperature of 45 °C.  
 ..... [1]
- (iii) Table 2.1 shows the oxygen concentration in sea water at different temperatures.

**Table 2.1**

temperature / °C	0	5	10	15	20	25	30	35
oxygen concentration / mg per dm <sup>3</sup>	11.4	10.0	8.6	8.0	7.4	6.4	6.0	5.4

Plot these data on Fig. 2.1.

[4]

(iv) Describe the differences between the oxygen concentrations in fresh water and in sea water.

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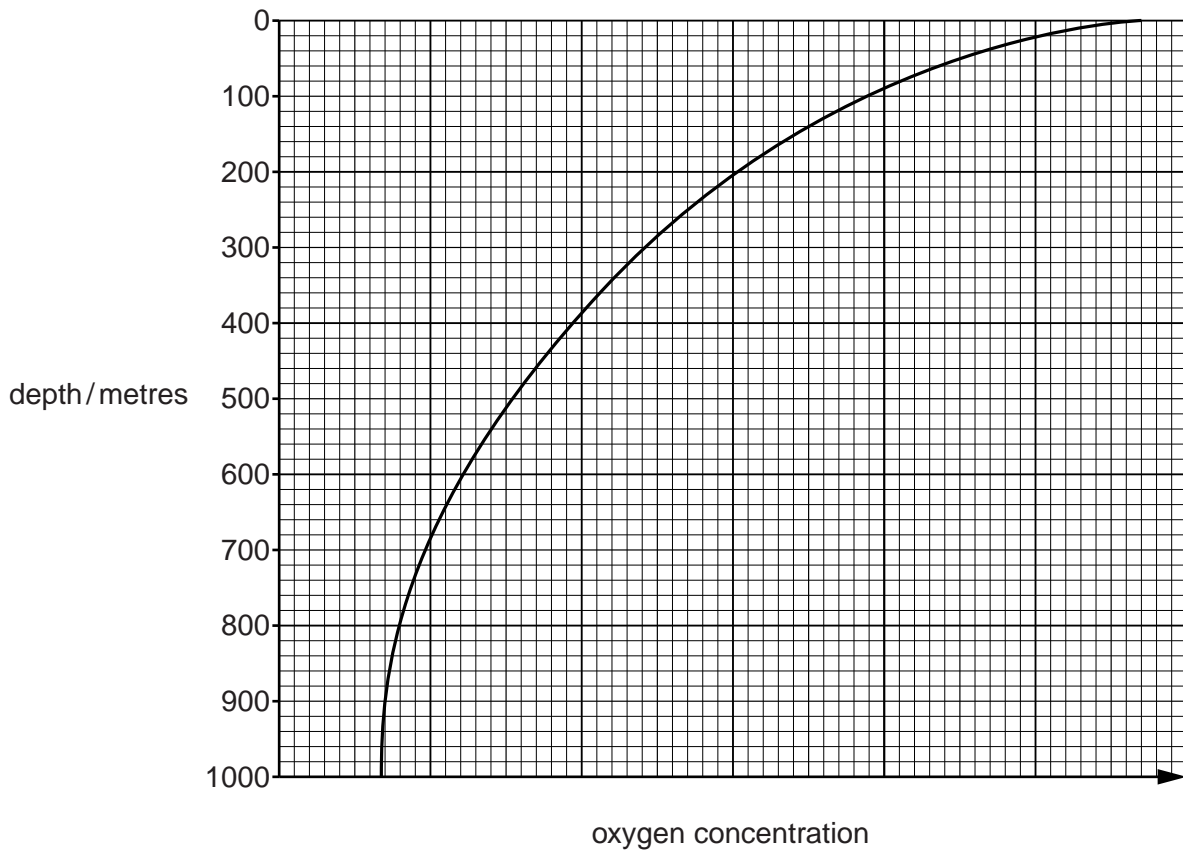
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[3]

(b) Fig. 2.2 shows the oxygen concentration at different depths in sea water.

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**Fig. 2.2**

Explain the relationship between oxygen concentration and depth as shown in Fig. 2.2.

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..... [5]

[Total: 15]

**Turn over for question 3.**





(c) Commercial fishing in this area targets cod and sheephead.

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Examiner's  
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Using the information in Fig. 3.1, suggest and explain **one** possible effect of commercial fishing on the population of sea otters.

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..... [4]

[Total: 11]

4 (a) Describe **three** pieces of evidence supporting the theory of plate tectonics.

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3 .....

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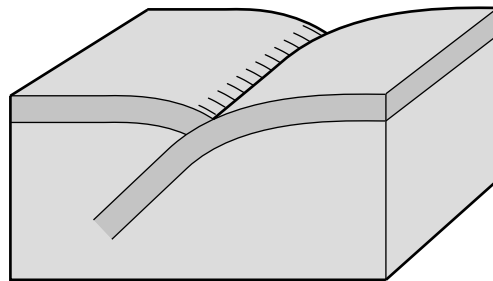
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.....[6]

(b) Fig. 4.1 shows one type of tectonic plate boundary.



**Fig. 4.1**

With reference to Fig. 4.1, explain how movements at a plate tectonic boundary can lead to the formation of an ocean trench.

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.....[3]

(c) Explain how movements at a plate tectonic boundary can lead to the formation of a tsunami.

*For  
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..... [4]

[Total: 13]

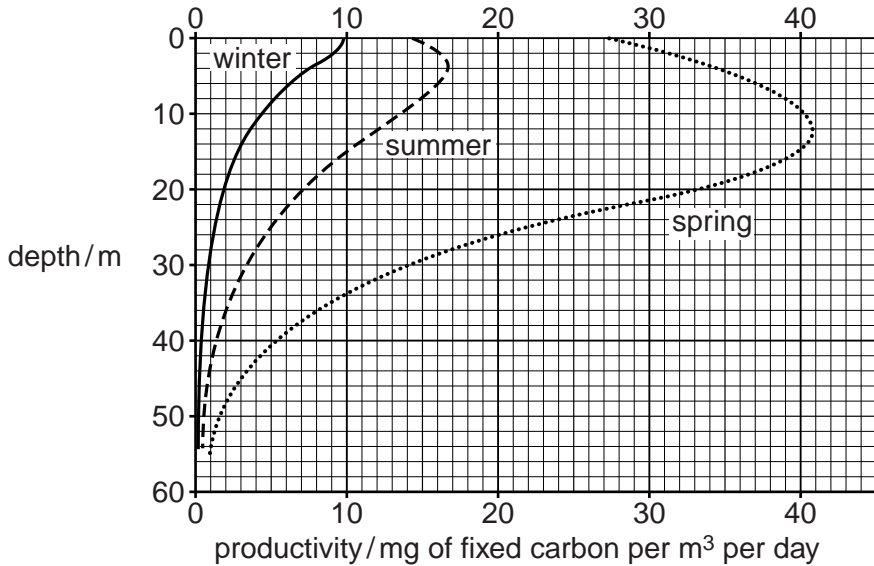
5 (a) (i) Explain what is meant by the term *productivity*, in marine ecosystems.

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..... [3]

(ii) List **three** factors which affect productivity.

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

(b) Fig. 5.1 shows variations in productivity with depth in the Northeast Pacific Ocean in winter, spring and summer.



**Fig. 5.1**

- (i) State the depth at which the difference in productivity between winter and spring is greatest.

*For  
Examiner's  
Use*

..... [1]

- (ii) Suggest explanations for the differences between the productivity in the Northeast Pacific Ocean in the winter and the spring.

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..... [4]

[Total: 11]

6 (a) Runoff is important in replenishing the reservoir of dissolved nutrients in the sea.

(i) Describe what is meant by the term *runoff*.

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

(ii) Suggest how runoff can be harmful to marine organisms.

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..... [3]

(iii) Suggest how runoff can be beneficial to marine organisms.

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..... [2]

(b) The mean concentration of calcium in sea water is 0.41 parts per thousand.

Suggest why this concentration remains approximately constant.

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[4]

[Total: 12]

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