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

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

5436460918

MARINE SCIENCE **9693/01**

Paper 1 AS Structured Questions **October/November 2012**

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.
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	
1	
2	
3	
4	
5	
6	
7	
Total	

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

For Examiner's Use

1 **(a)** Table 1.1 shows the mean rainfall during the Southwest monsoon in India calculated over a period of years.
Table 1.1 also shows the actual rainfall during the Southwest monsoon in 2006.

Table 1.1

region	mean rainfall / mm	actual rainfall in 2006 / mm
Northwest India	640	600
Central India	960	1120
Southern India	720	700
Northeast India	1400	1040
Total for all of India		

(i) Calculate the total mean rainfall and the total actual rainfall in 2006 and write your answers in Table 1.1. [2]

(ii) The data for actual rainfall in 2006 has been plotted on Fig. 1.1.

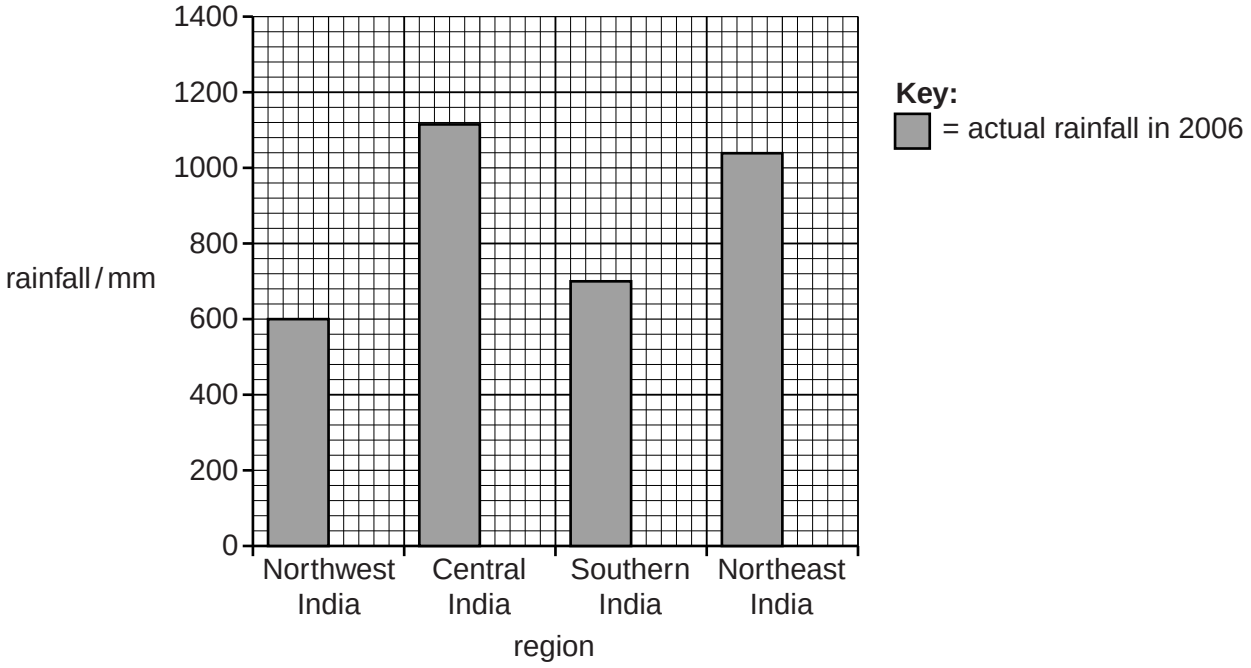

Fig. 1.1

Plot the data for the mean rainfall on Fig. 1.1.
Use shaded bars for your plots. [4]

(iii) State the region of India in which the difference between the mean rainfall and the actual rainfall was greatest.

.....[1]

(b) State what is meant by the term *monsoon*.

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.....[1]

(c) **(i)** State **two** features of tropical cyclones.

1 .....

.....

2 .....

.....[2]

(ii) State **two** conditions necessary for the formation of tropical cyclones.

1 .....

.....

2 .....

.....[2]

[Total: 12]

2 **(a)** Suggest **two** factors, other than feeding relationships, which affect the population of marine organisms.

1 .....

.....

2 .....

.....[2]

(b) Fig. 2.1 is a pyramid of biomass showing the mass of organisms at each trophic level that supports one whale.

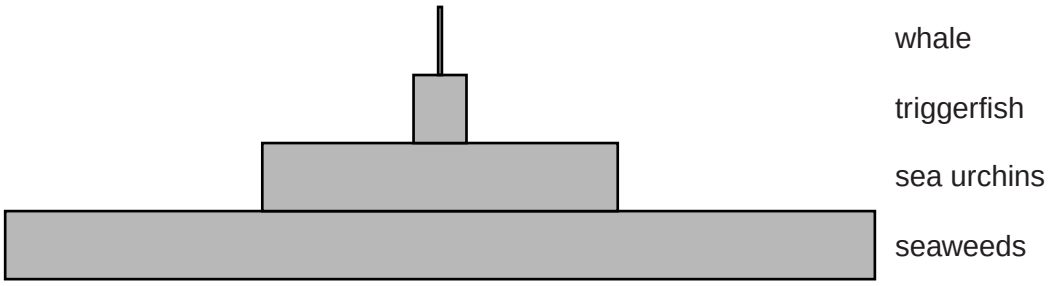

Fig. 2.1

(i) State the trophic level occupied by the seaweeds.

.....[1]

(ii) Large numbers of the sea urchins were harvested from the sea.

Explain the possible effects this could have on the populations of the other organisms in Fig. 2.1.

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.....[4]

(c) Fig. 2.2 shows part of a marine food web.

For Examiner's Use

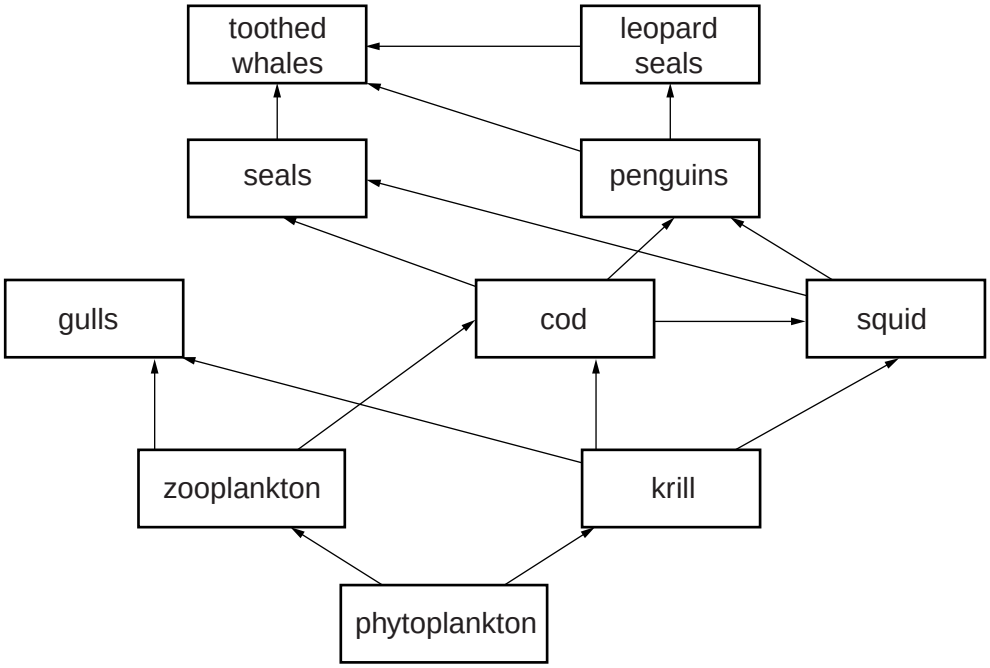

Fig. 2.2

Complete Table 2.1 by placing a tick in the boxes to indicate if each organism is a producer, prey, a primary consumer or a secondary consumer. [3]

Table 2.1

organism	**producer**	**prey**	**primary consumer**	**secondary consumer**
zooplankton				
cod				
seals				

[Total: 10]

3 **(a)** **(i)** Outline how carbon in the atmosphere becomes part of the phytoplankton in the sea.

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.....[3]

(ii) Explain how the carbon in the phytoplankton may become part of the carbon dioxide breathed out by humans.

.....

.....

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.....

.....[3]

(b) State **two** biological uses for phosphorus in marine organisms.

1 .....

2 .....[2]

(c) Fig. 3.1 shows the amount of phosphorus in the Baltic Sea from 1972 to 1998.

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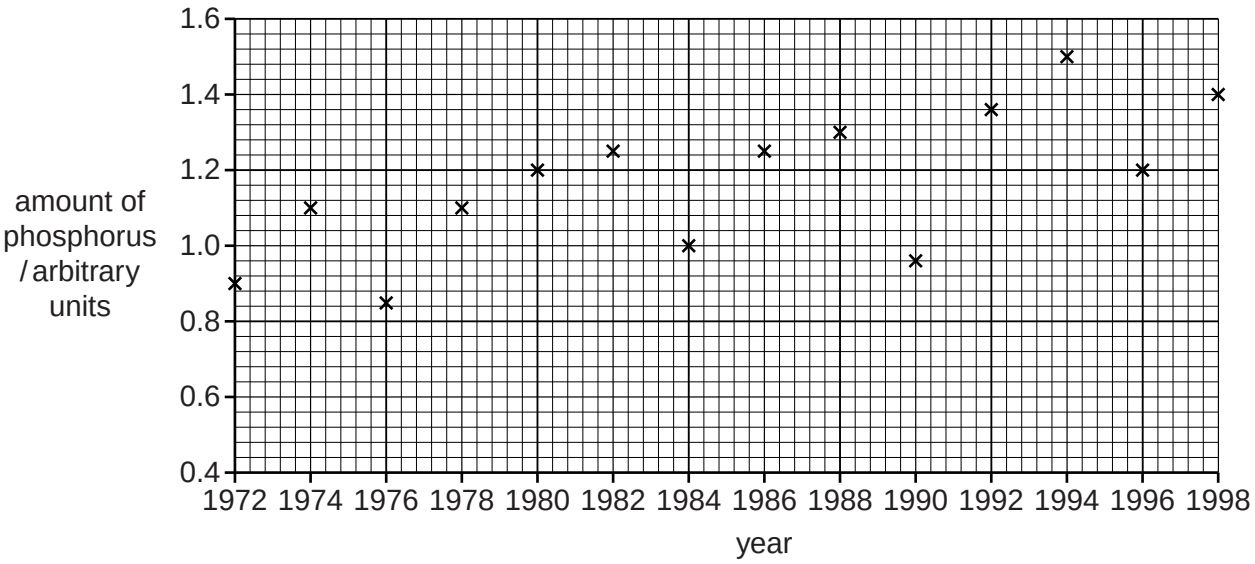

Fig. 3.1

(i) State the two-year period in which the decrease in the amount of phosphorus was the greatest.

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

(ii) Calculate the mean change in the amount of phosphorus per year between 1990 and 1994.
Show your working.

.....[2]

(iii) Suggest how the change you have calculated in **(ii)** may have affected the productivity of phytoplankton in the Baltic Sea.

.....[1]

[Total: 12]

4 **(a)** Explain how energy enters and passes through a food chain.

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.....[4]

(b) Table 4.1 shows the approximate total production of primary producers in several oceans in 2000.

Table 4.1

ocean	**total production / arbitrary units**
Pacific	19.7
Atlantic	14.5
Indian	8.0
Antarctic	2.9
Arctic	0.4
Mediterranean	0.6
Total	46.1

(i) Suggest why the figures in Table 4.1 are approximate.

.....[1]

(ii) Suggest why the largest production occurred in the Pacific Ocean.

For Examiner's Use

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.....[4]

[Total: 9]

5 **(a)** Fig. 5.1 shows two atolls **A** and **B**.

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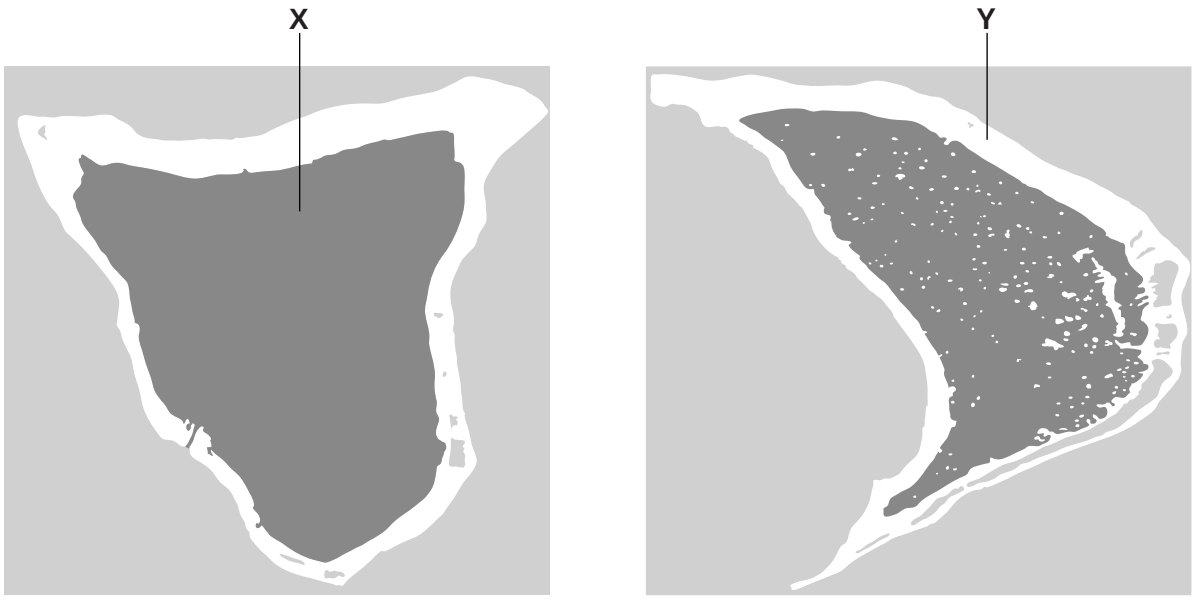

atoll A **atoll B**

Fig. 5.1

(i) Name the parts of the atolls labelled **X** and **Y**.

X .....

Y .....[2]

(ii) Other than size, state **two** ways in which atoll **A** differs from atoll **B**.

1 .....

.....

2 .....

.....[2]

(b) Describe the stages in the formation of an atoll.

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.....[5]

(c) Fig. 5.2 shows several reef balls which are used to create artificial reefs.

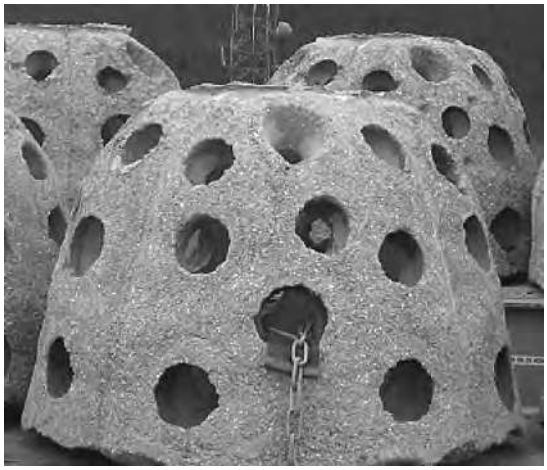

Fig. 5.2

Suggest why reef balls have the following properties

1 are very heavy .....

.....

2 have a rough surface .....

.....

3 are hollow .....

.....[3]

[Total: 12]

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

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.....[5]

(b) Fig. 6.1 shows a tide chart.

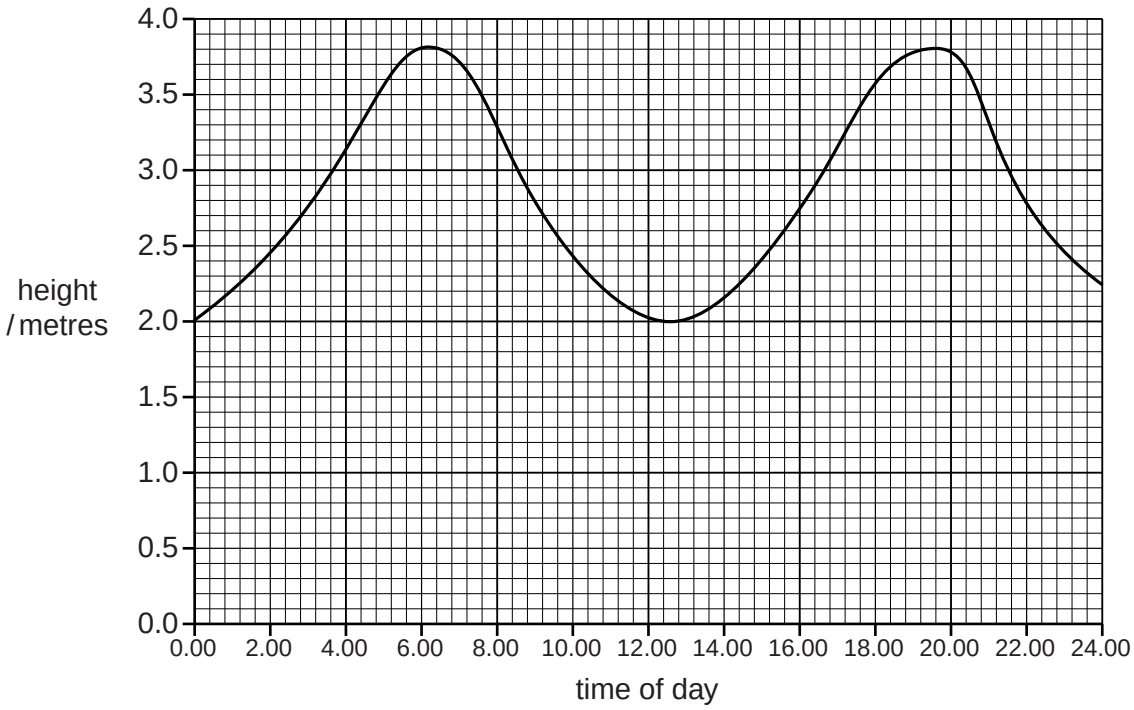

Fig. 6.1

(i) Define the term *tidal range*.

.....

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.....[2]

(ii) Calculate the tidal range shown in Fig. 6.1.

For Examiner's Use

.....[1]

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

1 .....

2 .....

3 .....[3]

[Total: 11]

7 **(a)** State **three** pieces of evidence which support the theory of plate tectonics.

1 .....

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2 .....

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3 .....

.....[3]

(b) Describe how tectonic processes lead to the formation of ocean trenches.

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.....[2]

(c) **(i)** Outline how hydrothermal vents are formed.

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.....[3]

(ii) Table 7.1 shows the location and depth of several hydrothermal vents.

Table 7.1

name of hydrothermal vent	longitude	latitude	depth / metres
Gakkel Ridge	7° 45′	85° 01′	3600
Kerbit Deep	36° 27′	24° 52′	1570
Suakin Deep	38° 73′	19° 53′	2830
Jean Charcot Deep	35° 58′	25° 25′	1500
Ashadze	44° 26′	12° 46′	4100
Mariana Trough	144° 59′	18° 21′	3675
Discovery Deep	38° 05′	21° 28′	2200
Carlsberg Ridge	61° 00′	5° 00′	3500

Give the names of the **two** hydrothermal vents which are closest to each other.

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

[Total: 9]

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