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

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

2436111596

MARINE SCIENCE **9693/01**

Paper 1 AS Structured Questions **May/June 2010**

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	
7	
Total	

This document consists of **13** printed pages and **3** blank pages.

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

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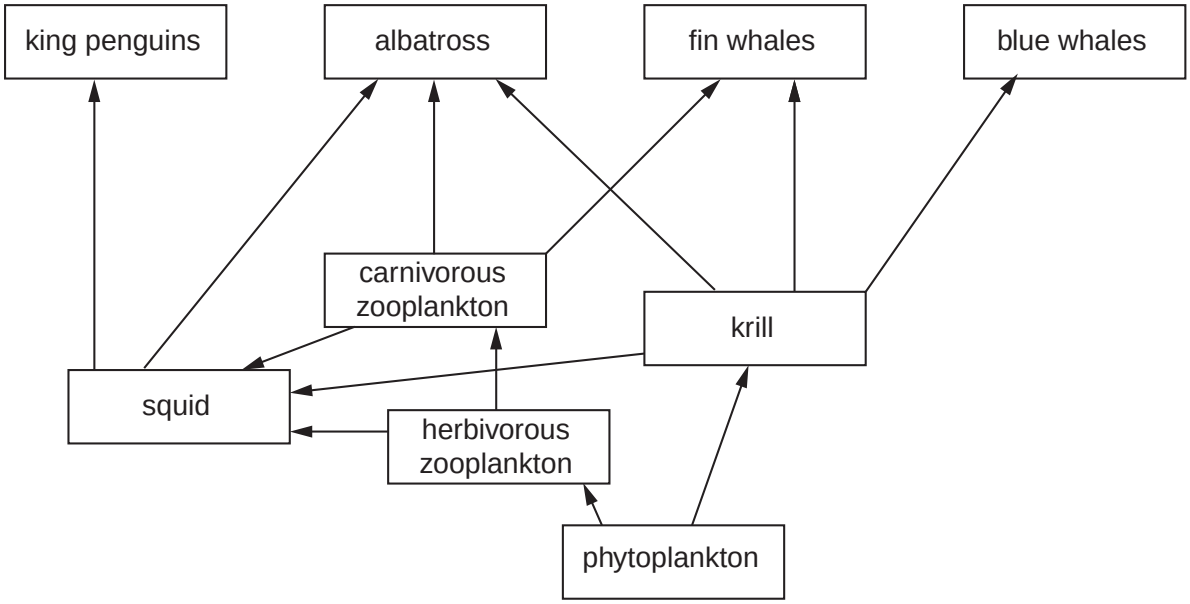

Fig 1.1

(a) (i) State the original source of energy for the organisms in the food web.

.....[1]

(ii) Describe the process which captures this energy.

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.....[4]

(b) **(i)** From the food web in Fig. 1.1, write out a food chain containing five organisms.

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[2]

(ii) From the food web in Fig. 1.1, name each of the following.

the producer .....

a primary consumer .....[2]

(c) Thick sheets of ice form on top of the water in winter.

With reference to the food web, suggest how this may affect the population of fin whales.

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.....[4]

(d) Suggest and explain the role of bacteria in this food web.

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.....[3]

2 **(a)** Explain what is meant by the term *ocean current*.

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.....[2]

(b) State **one** factor that is involved in the formation of surface ocean currents.

.....[1]

(c) Explain how temperature and salinity gradients form in water columns to produce layers in deep oceans.

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.....[4]

(d) Explain what is meant by the term *upwellings*.

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3 **(a)** Explain what is meant by the term *shoaling*.

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(b) Explain why shoaling may be an advantage to fish such as tuna and sardines.

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[Turn over

For Examiner's Use

4 **(a)** Suggest **three** factors which contribute to the erosion of coral reefs.

1 .....

2 .....

3 .....[3]

(b) A survey was carried out in 1990 to measure the percentage cover of six different substrates on two different coral reefs, **A** and **B**. The survey was repeated in 1995 and 2000. Table 4.1 shows the results of these surveys.

Table 4.1

substrate	reef **A**			reef **B**		
	percentage cover			percentage cover		
	1990	1995	2000	1990	1995	2000
bare rock	1	3	5	2	4	5
rubble	7	11	22	8	12	17
sand	4	5	7	13	13	16
soft coral	25	18	8	15	9	5
massive corals	12	10	9	8	6	4
other corals	51	53	49	54	56	53

(i) Calculate the percentage decrease in massive coral cover on reef **A** between 1990 and 2000.

Show your working.

.....[2]

(ii) Using the data in Table 4.1, explain on which reef, **A** or **B**, erosion was occurring more quickly.

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(c) Describe how the process of carbon dating can be used to reconstruct the history of a coral reef.

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.....[5]

5 Fig. 5.1 shows a comparison between normal conditions and El Niño conditions in the Pacific Ocean. The arrows indicate the wind and current directions.

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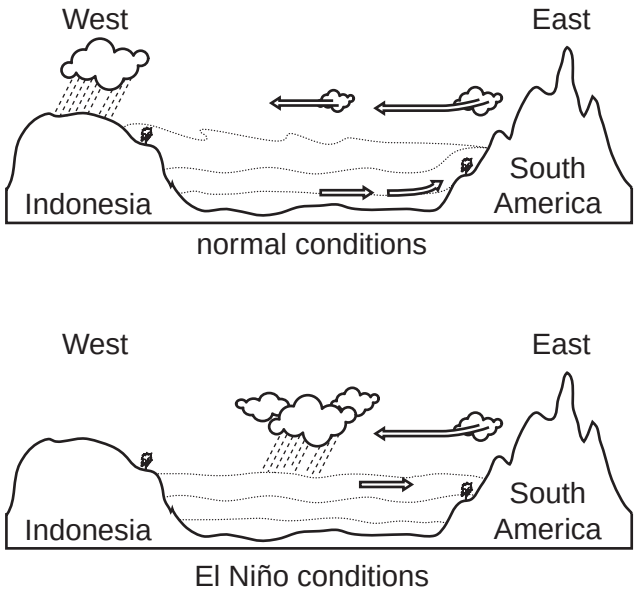

Fig. 5.1

(a) Use Fig. 5.1 to describe **three** differences between normal conditions and El Niño conditions.

1 .....

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2 .....

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3 .....

.....[3]

(b) Explain how El Niño conditions affect the fish populations near the coast of South America.

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.....[3]

(c) In El Niño conditions some parts of the oceans may become warmer than usual. Suggest how this may affect coral growing in these regions.

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.....[3]

6 **(a)** State what is meant by a *tsunami*.

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.....[2]

(b) State **one** cause of a tsunami.

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.....[1]

(c) Table 6.1 shows the relationship between water depth and wave speed during a tsunami.

Table 6.1

water depth / m	**wave speed /** km h^{-1}
10	40
50	75
100	105
150	135
200	160
250	185
300	210
350	235
400	260

(i) Plot the data in Table 6.1 on the grid. Draw a line of best fit through the points. [4]

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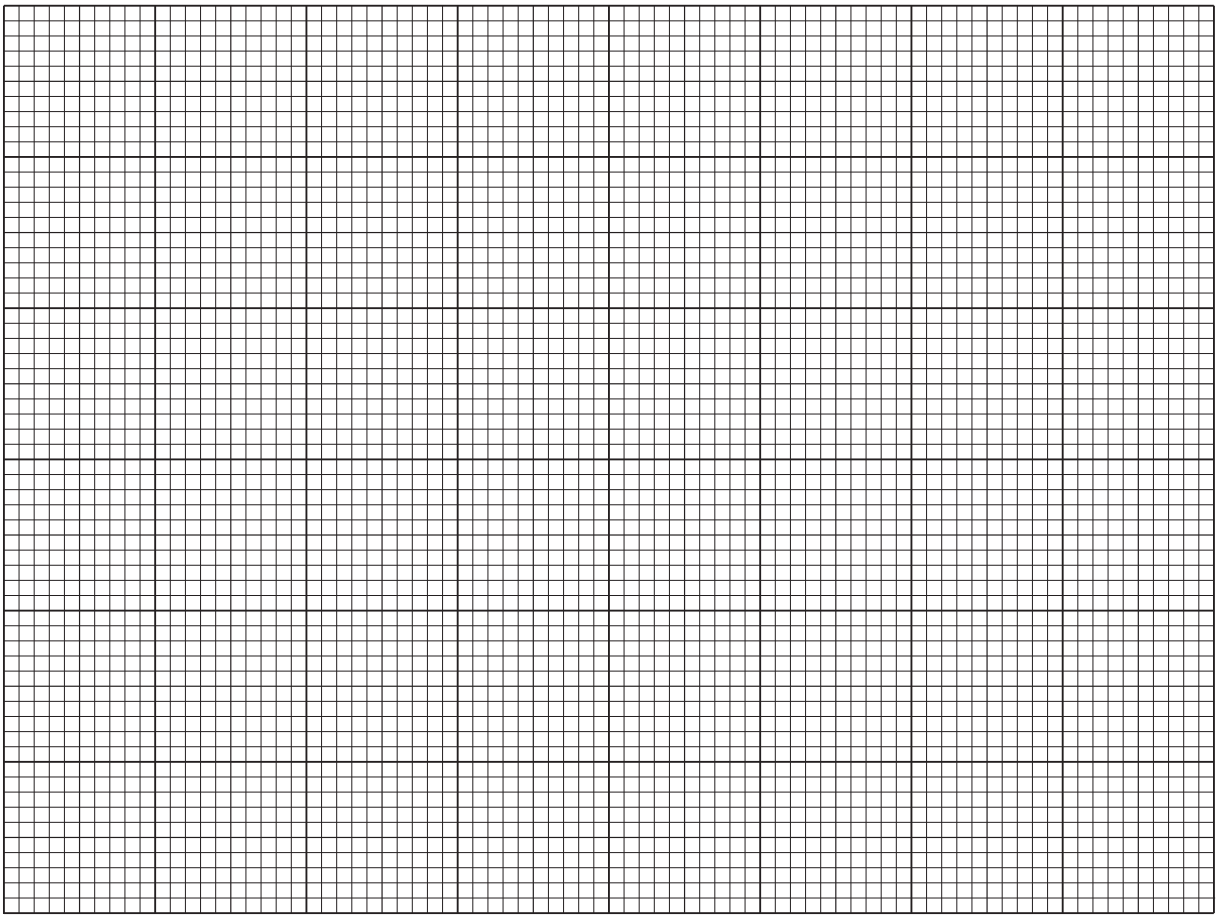

(ii) Use your graph to find the wave speed at a water depth of 175 metres.

..... [1]

(iii) Use the data in the graph to describe what happens as a tsunami wave gets closer to a shore.

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.....[1]

(iv) Use the data in Table 6.1 to predict how the wave height changes as the water depth decreases.

.....[1]

(d) Suggest **two** possible effects of a tsunami.

1 .....

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2 .....

.....[2]

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7 Tropical cyclones are also known as hurricanes and typhoons.

(a) State **three** features of a tropical cyclone.

1 .....

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2 .....

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3 .....

.....[3]

(b) State **two** conditions necessary for the formation of a tropical cyclone.

1 .....

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2 .....

.....[2]

(c) Fig. 7.1 shows the number of different categories of hurricane from 1970 to 2004 at 5-year intervals.

For Examiner's Use

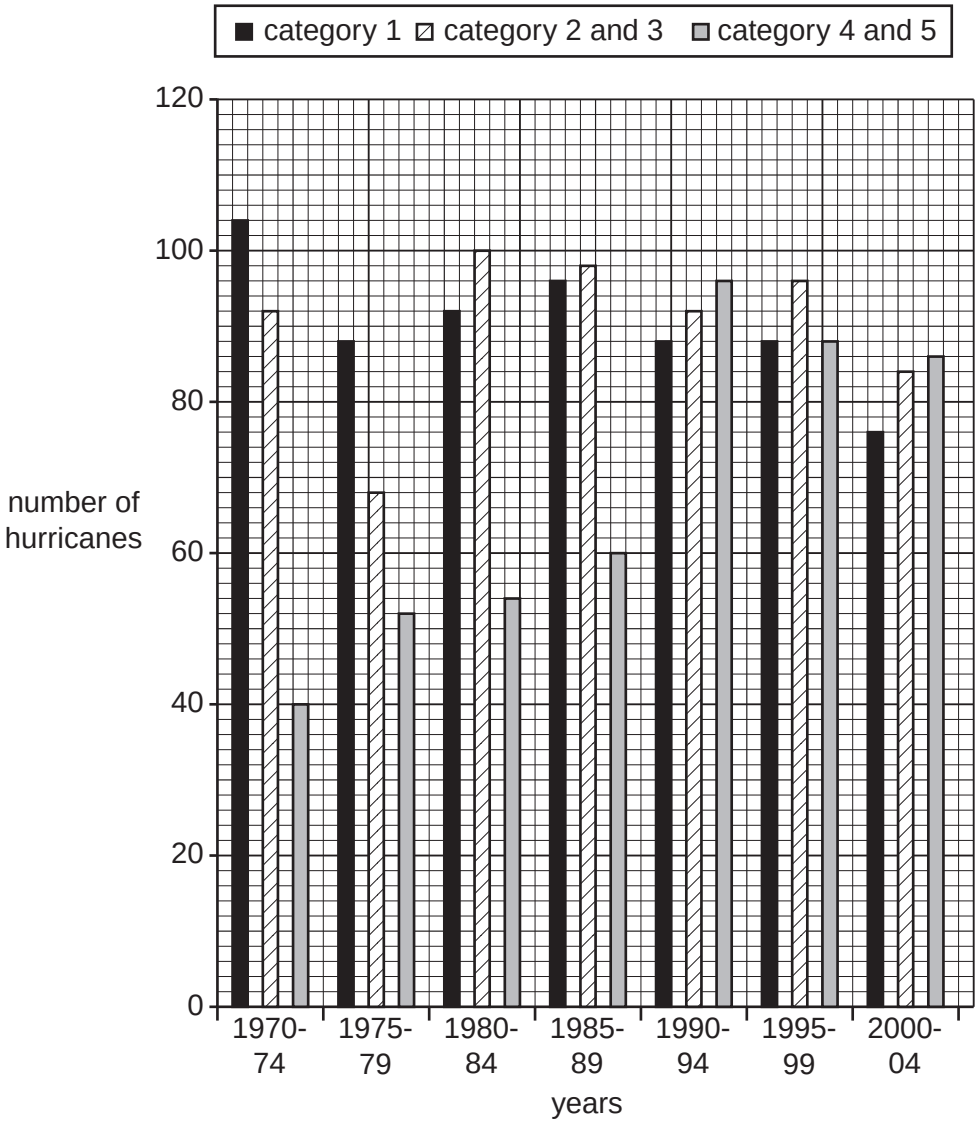

Fig. 7.1

(i) State the total number of category 4 and 5 hurricanes in the period 1990–1994.

..... [1]

(ii) Describe the changes in the number of category 4 and 5 hurricanes from 1970 to 1994.

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.....[2]

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