CANDIDATE NAME

CENTRE NUMBER

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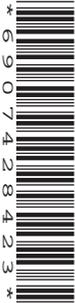
MARINE SCIENCE **9693/01**

Paper 1 AS Structured Questions **May/June 2011**

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)** Fig. 1.1 shows a marine food web.
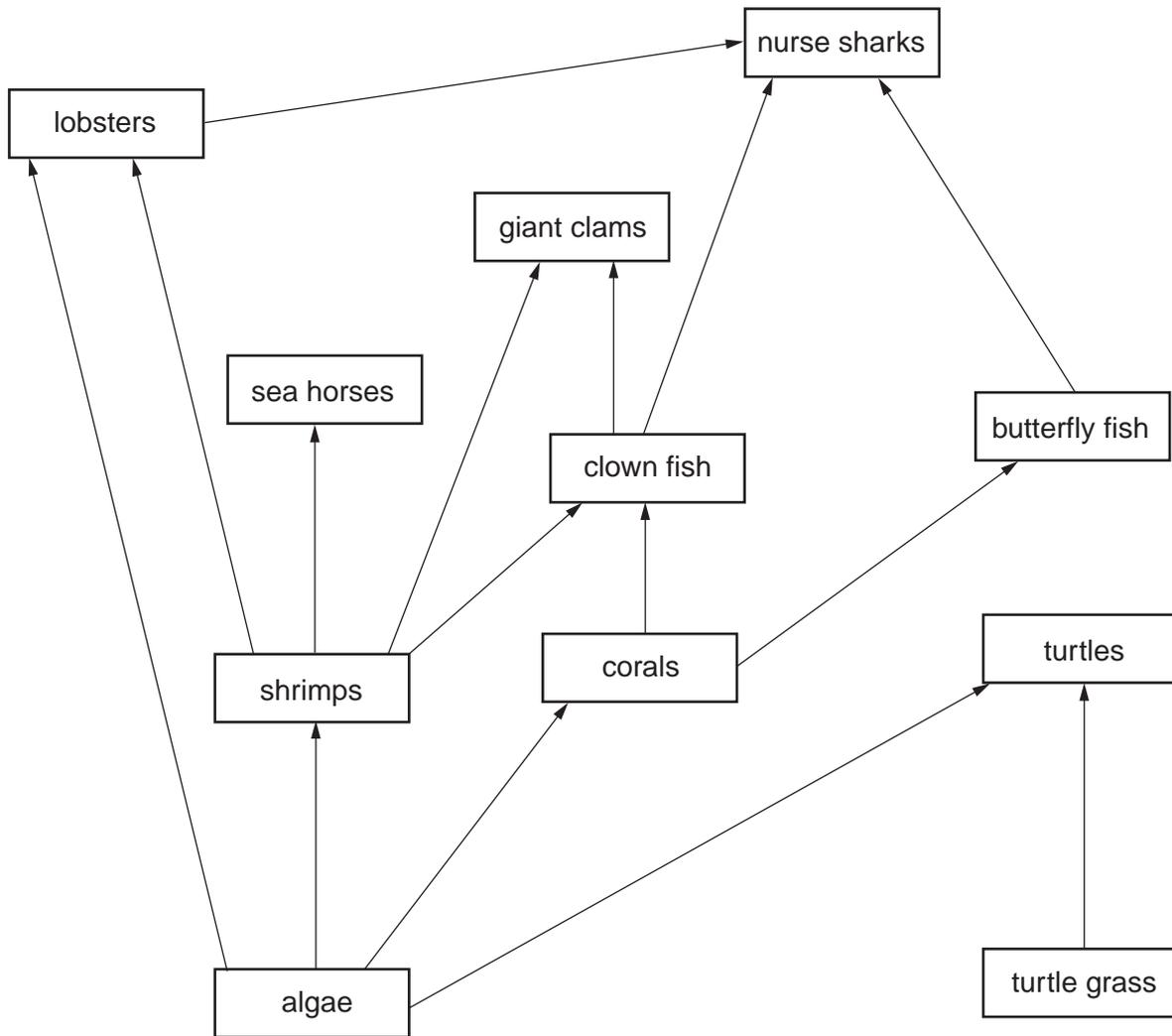
Fig. 1.1

(i) Name the producers shown in Fig.1.1.

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

(ii) Explain what the arrows between the organisms in Fig. 1.1 represent.

....

.... [2]

(iii) The giant clam is a predator.
Name **two** of its prey organisms.

1 ....

2 .... [2]

(iv) In the space below draw and label the expected pyramid of energy for the following food chain.

algae $\longrightarrow$ lobster $\longrightarrow$ nurse shark [3]

(b) Describe each of the following types of interrelationship and give **one** example of each within a marine ecosystem.

(i) symbiosis ....

....

....

....

....

.... [3]

(ii) parasitism ....

....

....

....

....

.... [3]

 [Turn over

2 **(a)** State **three** factors involved in the formation of atolls.

1 ....

2 ....

3 .... [3]

(b) State **two** methods used to date reefs.

1 ....

2 .... [2]

(c) Table 2.1 shows the percentage of reef islands that are more than 2 metres higher than mean sea level.

Table 2.1

reef islands	percentage of reef islands that are more than 2 metres higher than mean sea level	percentage of reef islands that are less than 2 metres higher than mean sea level
Cocos	33	67
Maldives	4	
Chagos	18	82
Marakei	32	68
Tuvalu	34	66

(i) Complete Table 2.1 for the Maldive Islands. [1]

(ii) Draw a bar chart to show the percentage of reef islands that are less than 2 metres higher than mean sea level. [4]
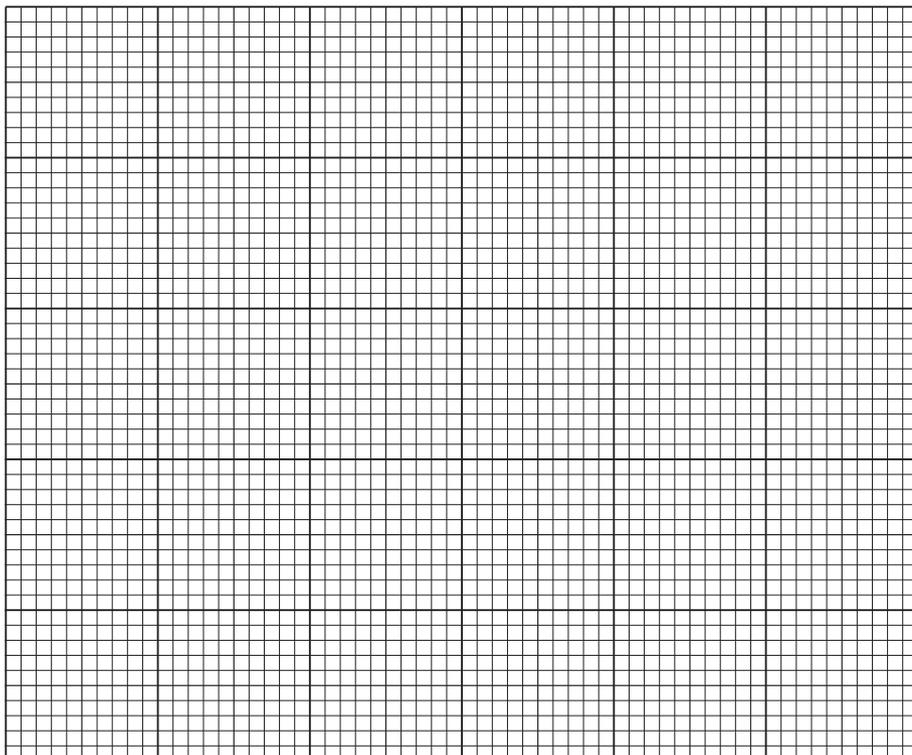
(d) Fig. 2.1 shows cross sections of two reefs, Fenua Tapu and Fongafale.

Fenua Tapu

Fongafale

KEY

[∴] sand   [●•●] rubble   [////] conglomerate platform
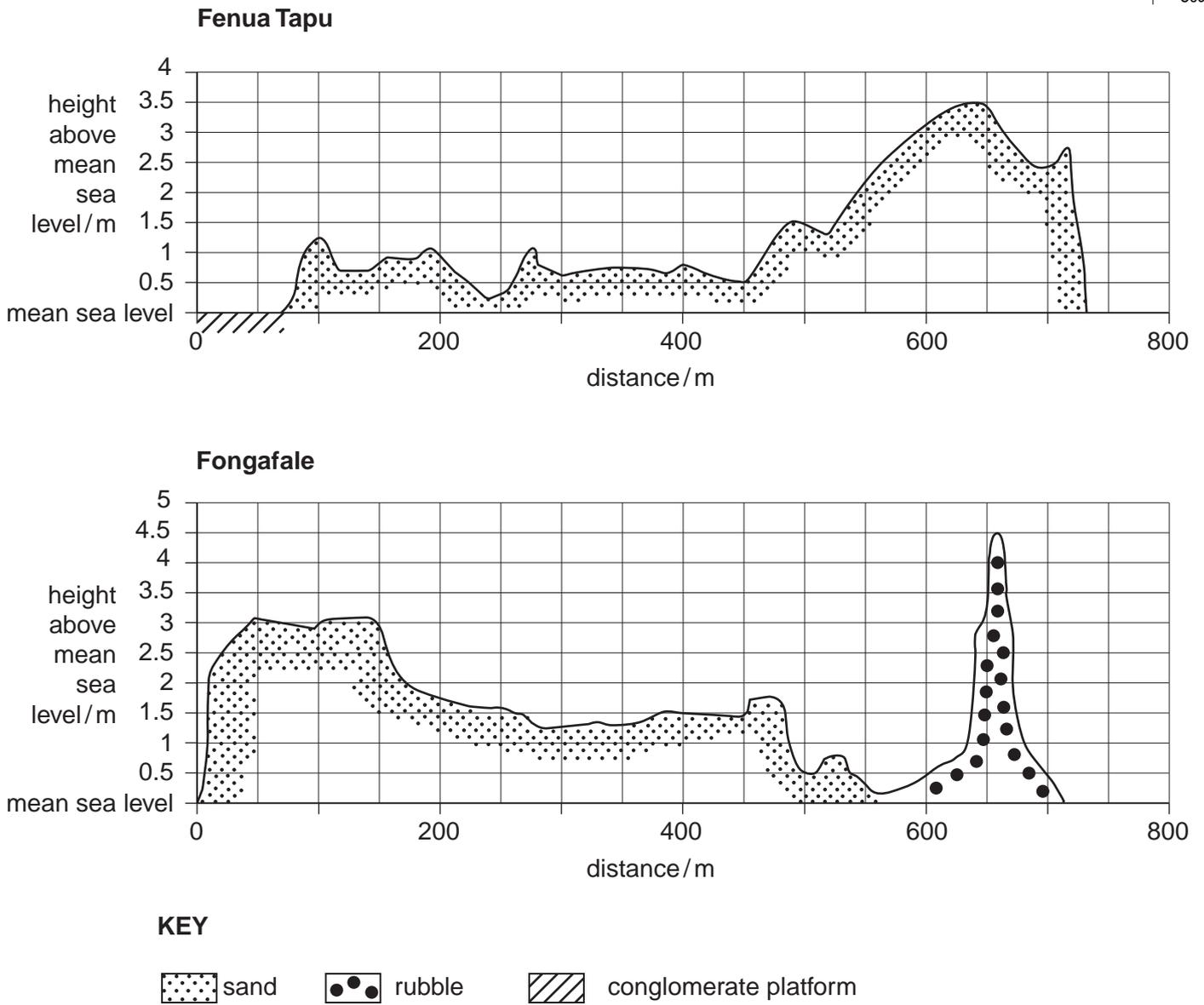
Fig. 2.1

State **two** differences between the two reefs shown in Fig. 2.1.

1 ....

....

2 ....

.... [2]

(e) The list below gives some of the stages in the formation of an atoll.

- barrier reef forms

- island subsides

- fringing reef develops on a volcanic island

- atoll forms

Write these stages in the correct sequence in the table.

sequence	stage
1	
2	
3	
4	

[3]

3   (a)   State what is meant by the term *salinity*.

....

.... [1]

(b)   Table 3.1 shows some of the ions present in fresh water and sea water.

Table 3.1

type of ion	percentage of total ion content	
	sea water	fresh water
iron	trace	0.74
calcium	1.19	16.62
magnesium	3.72	4.54
sodium	30.53	6.98
potassium	1.11	2.55
bicarbonate	0.42	31.9
sulphate	7.67	12.41
chloride	55.16	8.64
nitrate	trace	1.11
bromide	0.2	trace

Use the information in Table 3.1 to calculate the difference in the sodium chloride content of fresh water and sea water.

.... [1]

(c) Fig. 3.1 shows how rainfall and salinity vary with latitude.

Key
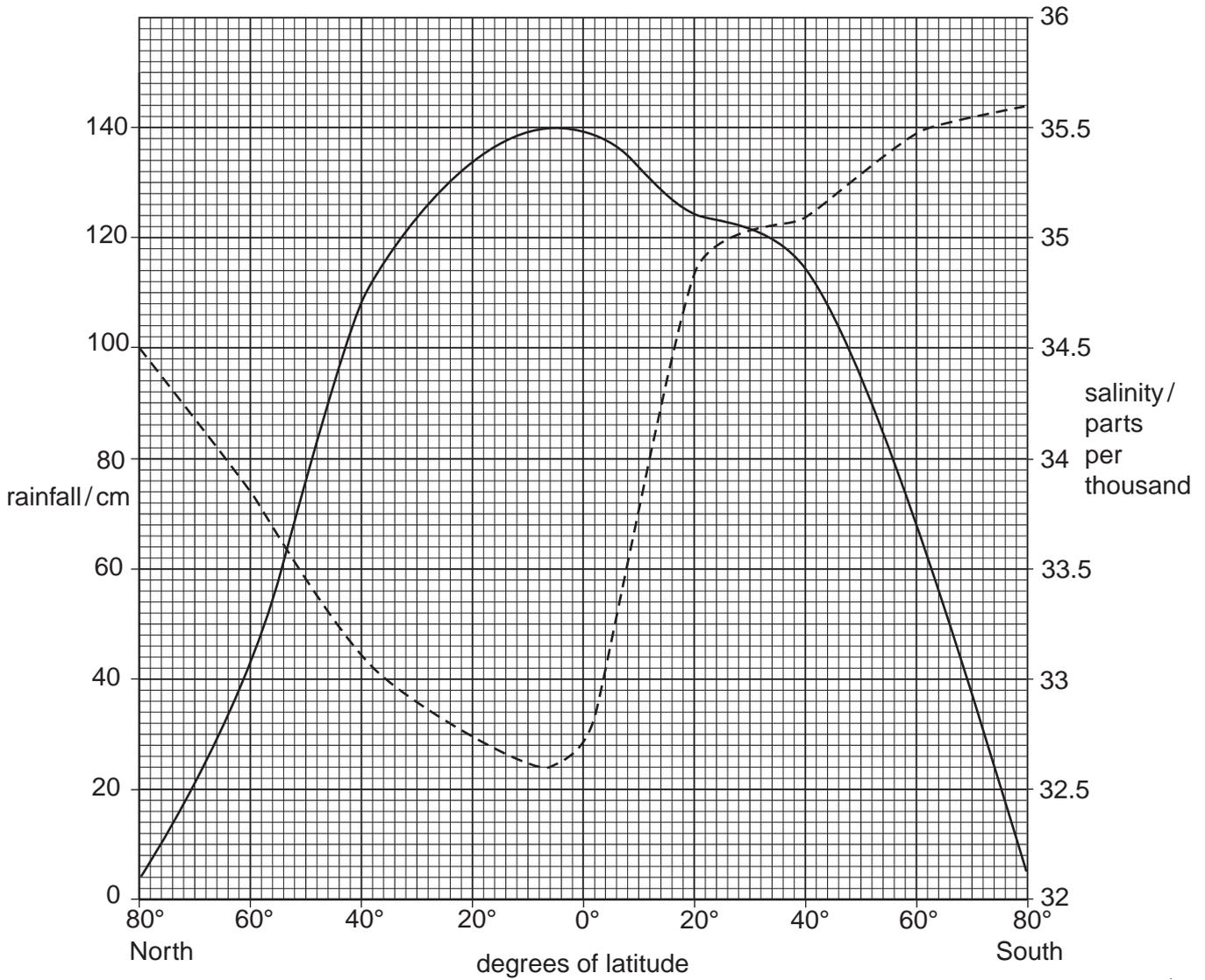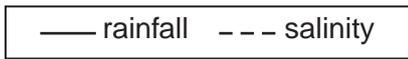
──── rainfall – – – salinity

Fig. 3.1

Use Fig. 3.1 to find each of the following.

(i) the rainfall at 70° North

.... [1]

(ii) the range of salinity

.... [1]

(iii) Describe the changes in salinity between 40° North and 40° South.

....

....

....

.... [3]

(iv) State the relationship between salinity and rainfall at latitudes 0° to 80° North.

....

.... [1]

(v) State **two** factors, other than rainfall, that affect the salinity of seawater.

1 ....

2 .... [2]

(d) Suggest how global warming may affect the salinity of the oceans.
Give an explanation for your answer.

....

....

....

....

....

....

....

.... [4]

4 (a) Give **two** factors required for the development of a tropical cyclone.

1 ....

2 .... [2]

(b) Table 4.1 shows the relationship between the distance from the centre of a cyclone and the amount of rainfall.

Table 4.1

distance from centre of cyclone/km	rainfall/mm
55	864
110	336
220	108
310	30
370	10

(i) Use the information in Table 4.1 to describe the relationship between the distance from the centre of the cyclone and rainfall.

.... [2]

(ii) Estimate the rainfall at 340 km from the centre of the cyclone.

.... [1]

(c) State **two** features, other than rainfall, of tropical cyclones.

1 ....

2 .... [2]

(d) Tropical cyclones develop over the sea.

(i) State **three** destructive effects that can occur when a cyclone reaches land.

1 ....

....

2 ....

....

3 ....

.... [3]

(ii) Suggest **one** beneficial effect that may occur when a cyclone reaches land.

.... [1]

5 (a) (i) State **two** biological reasons why the concentration of oxygen in seawater varies.

1 ....

....

2 ....

.... [2]

(ii) State **three** physical reasons why the concentration of oxygen in seawater varies.

1 ....

....

2 ....

....

3 ....

.... [3]

(b) Table 5.1 shows the oxygen concentration at different depths in the sea at three different locations.

Table 5.1

depth/metres	oxygen concentration/mg per dm^3			
	location 1	location 2	location 3	mean
0	7.24	6.92	4.94	6.36
50	7.27	6.99	5.12	6.46
100	7.24	6.81	5.06	6.37
200	6.70	6.84	4.85	
800	6.98	6.60	5.23	6.27
1000	6.96	6.64	3.68	5.76
1500	6.99	6.39	3.65	5.67
2000	6.85	6.39	3.53	5.59
2500	6.53	6.28	3.67	5.49

(i) Calculate the mean oxygen concentration at a depth of 200 metres.
Write your answer in Table 5.1. [1]

(ii) Suggest why the measurements taken at each depth at each location were repeated several times.

....

....

....

.... [2]

6 **(a)** Describe the theory of plate tectonics.

....

....

....

....

....

....

....

.... [4]

(b) Tectonic processes lead to the formation of mid-ocean ridges, tsunamis and abyssal plains.
Describe each of these features and explain how they are formed by tectonic processes.

(i) mid-ocean ridges

....

....

....

.... [2]

(ii) tsunamis

....

....

....

.... [2]

(iii) abyssal plains

....

....

....

.... [2]

(c) Explain why water coming from hydrothermal vents is hot and rich in minerals.

    (i) hot ....

         .... [1]

    (ii) rich in minerals ....

         .... [1]

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