Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

MARINE SCIENCE **9693/01**

Paper 1 AS Structured Questions **October/November 2015**

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Write your answers in the spaces provided on the Question Paper.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

DC (ST/JG) 98815/3

CAMBRIDGE International Examinations

[Turn over

Answer **all** the questions in the spaces provided.

1 (a) (i) Explain the term *parasitism*.

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.....[2]

(ii) Describe an example of parasitism within a marine environment.

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.....[2]

(b) (i) Explain the term *symbiosis*.

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.....[2]

(ii) Describe an example of symbiosis within a marine environment.

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.....[2]

[Total: 8]

Question 2 begins on page 4

2 **(a)** Fig. 2.1 shows a graph of the growth rate of the coral, *Montastraea annularis*, at different depths in the ocean.

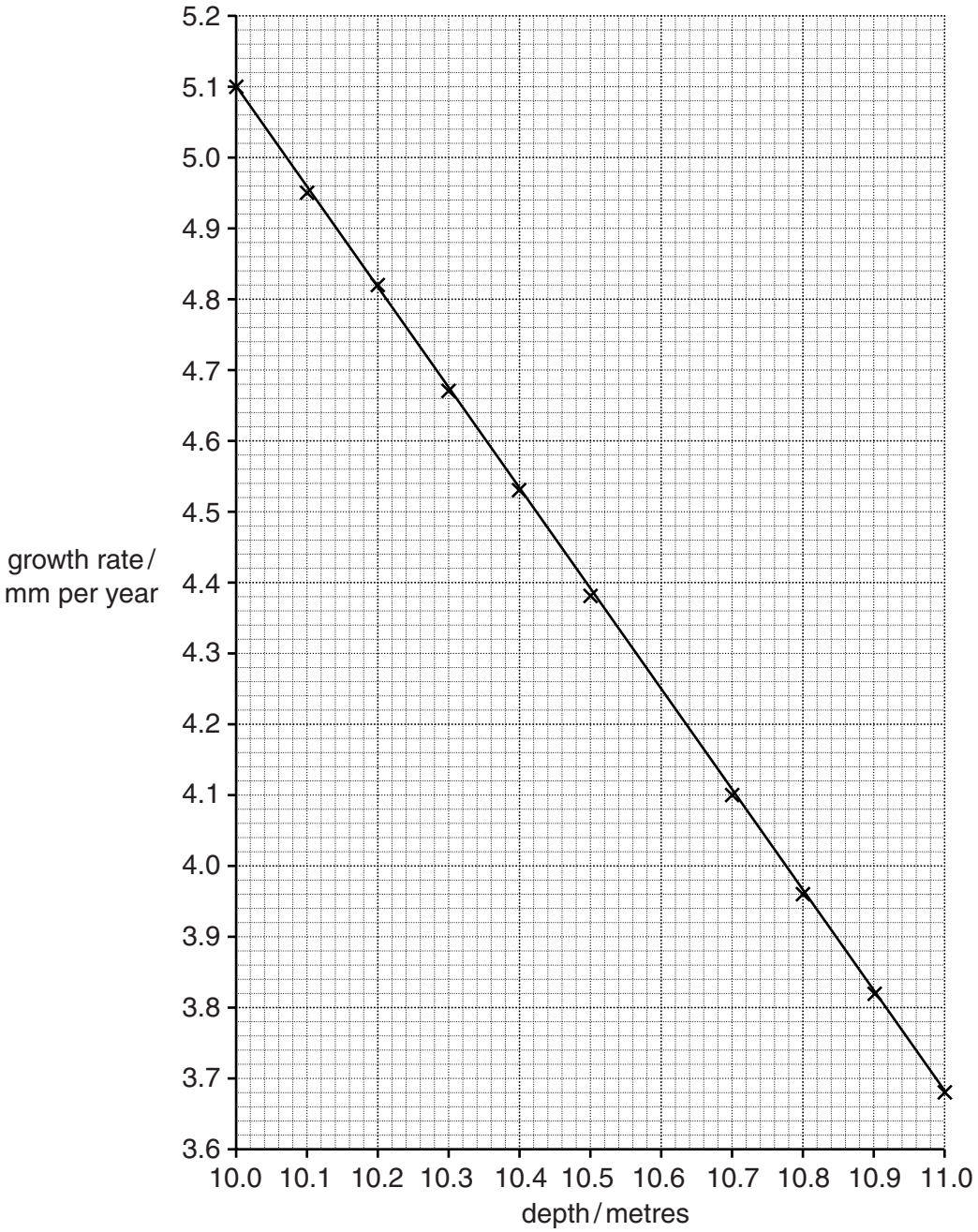

Fig. 2.1

(i) Use Fig. 2.1 to find the growth rate of *Montastraea annularis* at a depth of 10.6 metres. Show your working on Fig. 2.1.

growth rate = ...[2]

(ii) With reference to Fig. 2.1, describe the relationship between depth and the growth rate of *Montastraea annularis*.

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.....[3]

(iii) Suggest explanations for this relationship.

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.....[4]

(b) Fig. 2.2 shows an aerial photograph of an atoll.

Fig. 2.2

(i) Name the parts labelled **A**, **B** and **C**.

A .....

B .....

C .....[3]

(ii) Describe the Darwin-Dana-Daly theory of atoll formation.

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.....[4]

[Total: 16]

3 **(a)** Fig. 3.1 shows part of a food web on a rocky shore.

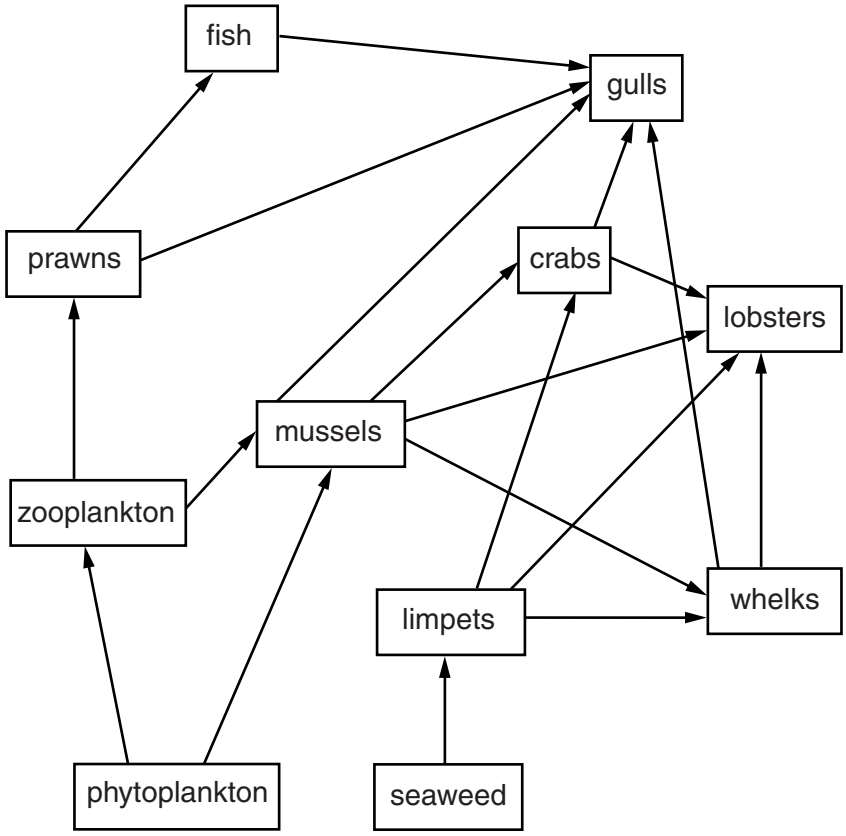

Fig. 3.1

(i) Using the information in Fig. 3.1, write a food chain which contains mussels and has five trophic levels in the boxes below.

[1]

(ii) With reference to Fig. 3.1, discuss how overfishing of lobsters could affect the population of mussels.

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.....[4]

(b) Fig. 3.2 shows the energy flow through part of one food chain from the food web in Fig. 3.1. The figures are in arbitrary units.

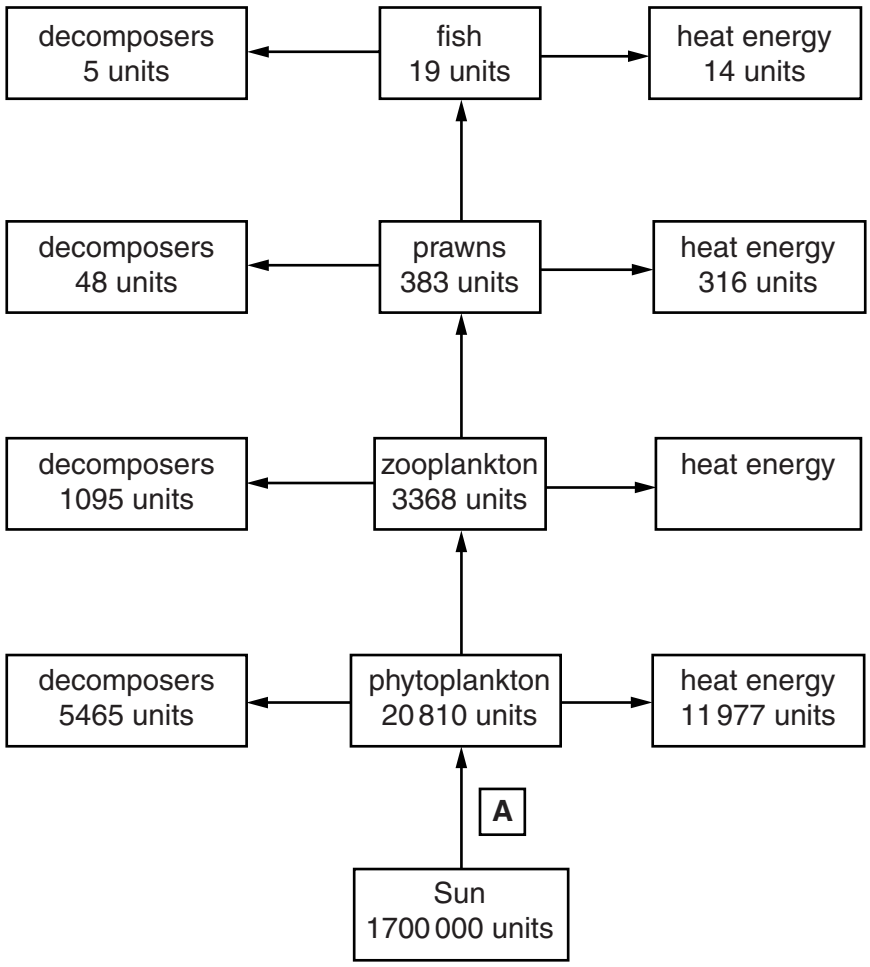

Fig. 3.2

(i) Outline the process taking place at point **A** in the food chain.

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.....

.....

.....

.....

.....[3]

(ii) Calculate the heat energy lost by the zooplankton.
Show your working.

.....[2]

(iii) Calculate the percentage of the energy in the phytoplankton which is eventually transferred to the fish.
Show your working.

..... % [2]

(iv) Suggest why the efficiency of energy transfer between the phytoplankton and the fish is very low.

.....

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.....[3]

(v) Suggest how the activity of the decomposers can affect the productivity of the food chain.

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.....

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.....[2]

[Total: 17]

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

.....

.....[1]

(b) **(i)** State a biological use for each of these ions found in sea water.

magnesium .....

.....

calcium .....

.....

nitrate .....

.....[3]

(ii) State **two** sources of the ions present in sea water.

1 .....

.....

2 .....

.....[2]

(iii) State **two** natural processes which remove ions from sea water.

1 .....

.....

2 .....

.....[2]

(c) (i) Suggest an explanation for each of these observations regarding the salinity of sea water.

> The sea water in Florida Bay has a mean salinity of 41.2 parts per thousand in summer and a mean salinity of 24.8 parts per thousand in winter.

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.....[2]

(ii)

> Some parts of the Arctic Ocean have a mean salinity of 30.0 parts per thousand in summer, compared to a mean salinity of 35.0 parts per thousand in other oceans.

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.....[2]

[Total: 12]

5 (a) (i) Explain the meaning of the term *estuary*.

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.....[2]

(ii) Organisms need to be specially adapted to survive the conditions present in an estuarine environment.

State **two** conditions in an estuary to which organisms need to be adapted.

1 .....

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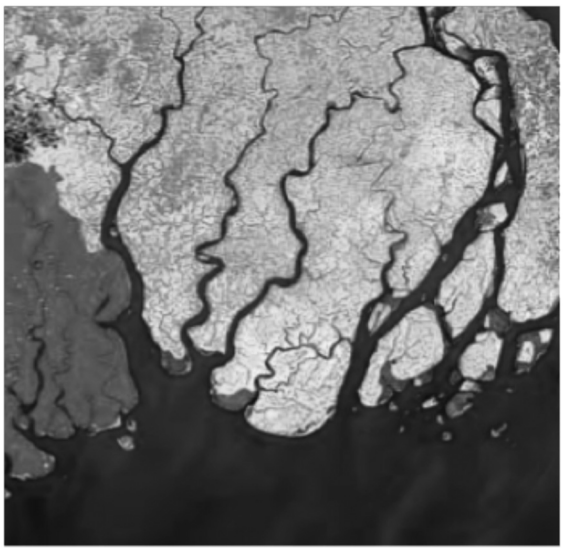
2 .....

.....[2]

(b) Fig. 5.1 shows photographs of three different types of littoral zone.
The photograph in Fig. 5.1**A** has been taken from space.



A

B

C

Fig. 5.1

(i) Name the three types of littoral zone shown in Fig. 5.1.

A .....

B .....

C .....[3]

(ii) Explain how a muddy shore is formed.

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.....[4]

(iii) Mangrove trees are able to grow successfully on muddy shores.
Suggest how mangrove trees are adapted to grow on muddy shores.

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.....[2]

[Total: 13]

6 (a) (i) Describe what is meant by the term *abyssal plain*.

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.....[2]

(ii) Describe how abyssal plains are formed.

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.....[3]

(b) Table 6.1 describes some tectonic processes and the features formed by these processes. Complete the table by naming the features formed.

Table 6.1

tectonic process	description of feature	name of feature formed
upward movement and spreading of the underlying magma at a divergent plate boundary	underwater mountain range	
diverging or converging plate boundaries	fissure through which hot gases and molten rock can escape	
where one plate is forced under another plate	very long, narrow structures on the ocean floor	
abrupt slippage of one plate against another at a convergent plate boundary	sudden movement of a very large volume of water	

[4]

[Total: 9]

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