Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

1184876434

MARINE SCIENCE **9693/13**

Paper 1 AS Structured Questions **May/June 2018**

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.

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

CAMBRIDGE International Examinations

1 Fig. 1.1 shows a black smoker on the sea bed. Black smokers are a type of hydrothermal vent often populated by tube worms.

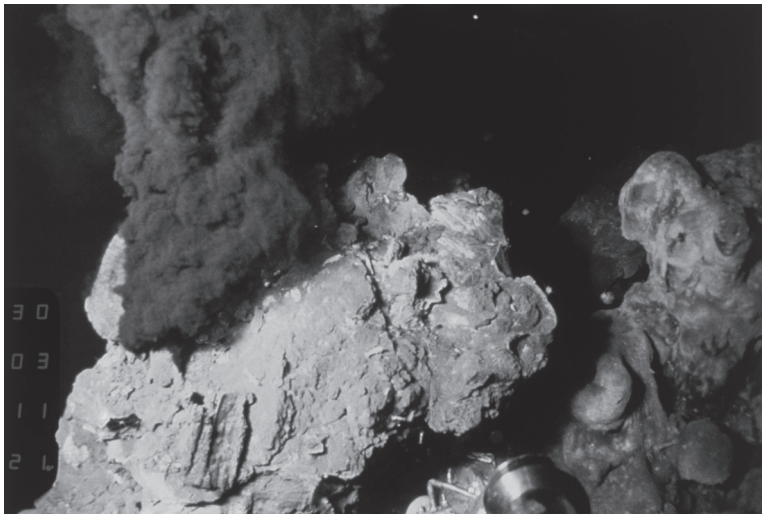

Fig. 1.1

(a) State **two** features of hydrothermal vents that classify them as extreme environments.

1 .....

2 .....
[2]

(b) **(i)** Explain why the water leaving hydrothermal vents is rich in minerals.

.....

.....

.....

.....[2]

(ii) Some minerals provide nutrients for marine organisms.

For each of the following, suggest **one** use for organisms living near hydrothermal vents.

phosphorus .....

.....

calcium .....

.....
[2]

(c) Describe the processes involved in hydrothermal vent formation.

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.....[3]

(d) With reference to the tube worms found at hydrothermal vents, explain the meanings of the following ecological terms.

(i) *mutualism* .....

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.....[3]

(ii) *succession* .....

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.....[3]

[Total: 15]

2 Fig. 2.1 shows the stages involved in the formation of an atoll, according to the Darwin-Dana-Daly theory.

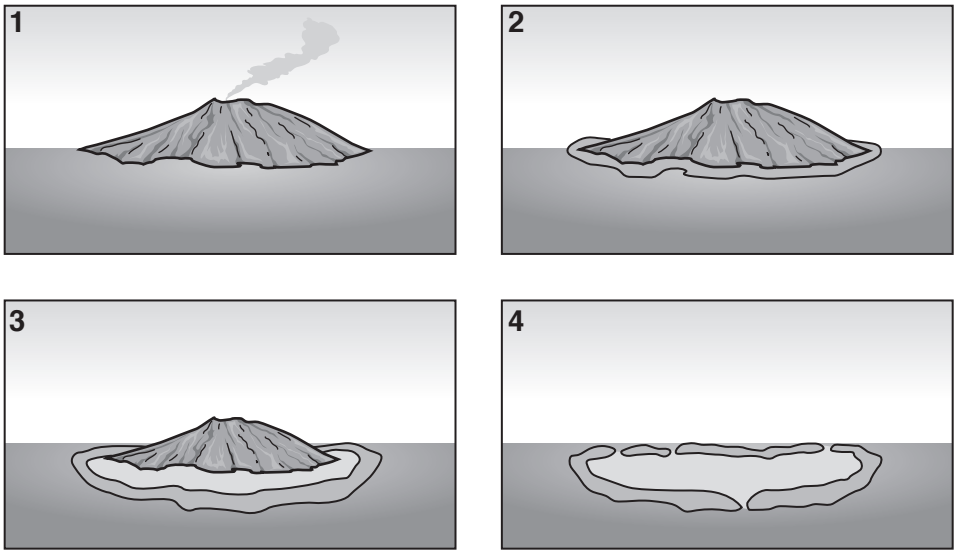

Fig. 2.1

(a) Describe the events occurring at stages **1–4** in Fig. 2.1.

1	....
2	....
3	....
4	....

[4]

(b) The Darwin-Dana-Daly theory relates the distribution of tropical coral to its physiology.

Describe the conditions that allow for successful growth of coral reefs.

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.....[3]

(c) State **two** factors that can lead to transition from the growth of a coral reef to its erosion.

1 .....

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2 .....

.....

[2]

(d) State **two** techniques that could be used to help reconstruct the history of a coral reef.

1 .....

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2 .....

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[2]

[Total: 11]

3 Fig. 3.1 shows the total energy in each trophic level in a marine food chain in one year. The figures are given in arbitrary units.

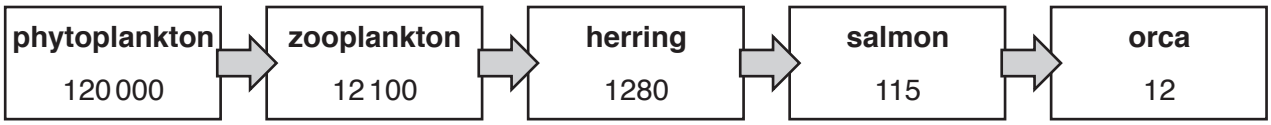

Fig. 3.1

(a) Explain why phytoplankton can be described as producers for this food chain.

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.....

.....[2]

(b) Use the information in Fig. 3.1 to calculate the percentage energy loss between zooplankton and herring.

Show your working.

.....%
[2]

(c) Suggest reasons for the loss of energy that occurs between zooplankton and herring in this food chain.

.....

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.....

.....

.....

.....[3]

(d) Sketch and label a pyramid of energy for this food chain. Your pyramid does not have to be drawn to scale.

[3]

(e) Suggest the possible impacts of a large reduction in the herring population on the other populations in this food chain. Explain your suggestions.

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.....[3]

[Total: 13]

4 Fig. 4.1 shows the typical movement of air between the Indian Ocean and the Asian continent in July.

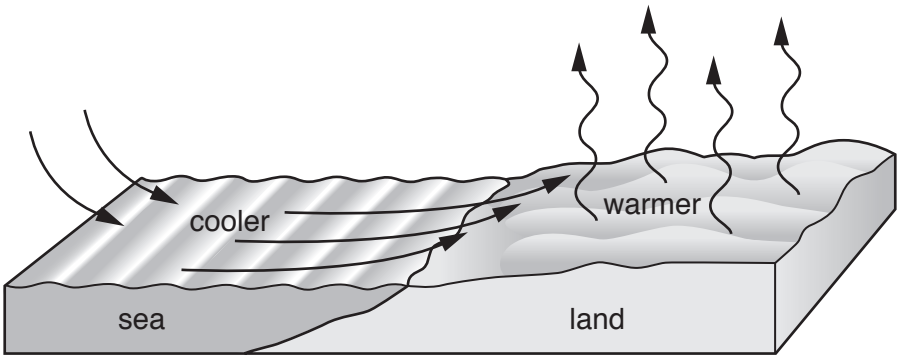

Fig. 4.1

(a) What name is given to winds generated between the Indian Ocean and the Asian continent?

.....[1]

(b) With reference to Fig. 4.1, explain how the wind in July is generated.

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.....[3]

(c) Explain how the wind pattern would be different in the cooler month of November.

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.....[2]

[Total: 6]

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5 *Ulva intestinalis*, *Fucus vesiculosus* and *Laminaria digitata* are three species of seaweed commonly found around the coasts of Northern Europe. Table 5.1 provides information about each species. The diagrams are not drawn to scale.

Table 5.1

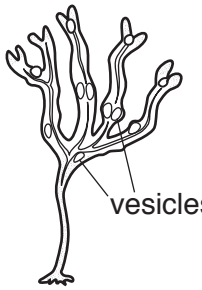
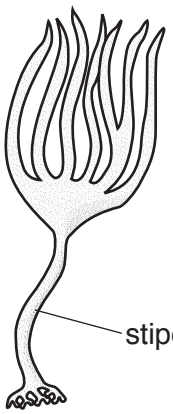
species	*U. intestinalis*	*F. vesiculosus*	*L. digitata*
description	A green thread-like alga, typically 10–30 cm in length. 	A brown alga, typically 50 cm to 2 m in length. Air-filled vesicles on fronds. 	A brown alga, with long stipe (stalk) and fronds that may exceed 2 m in length. 

Fig. 5.1 shows the distribution of these algae within the littoral zone on a rocky shore. The taller the shaded area the greater the coverage by each species.

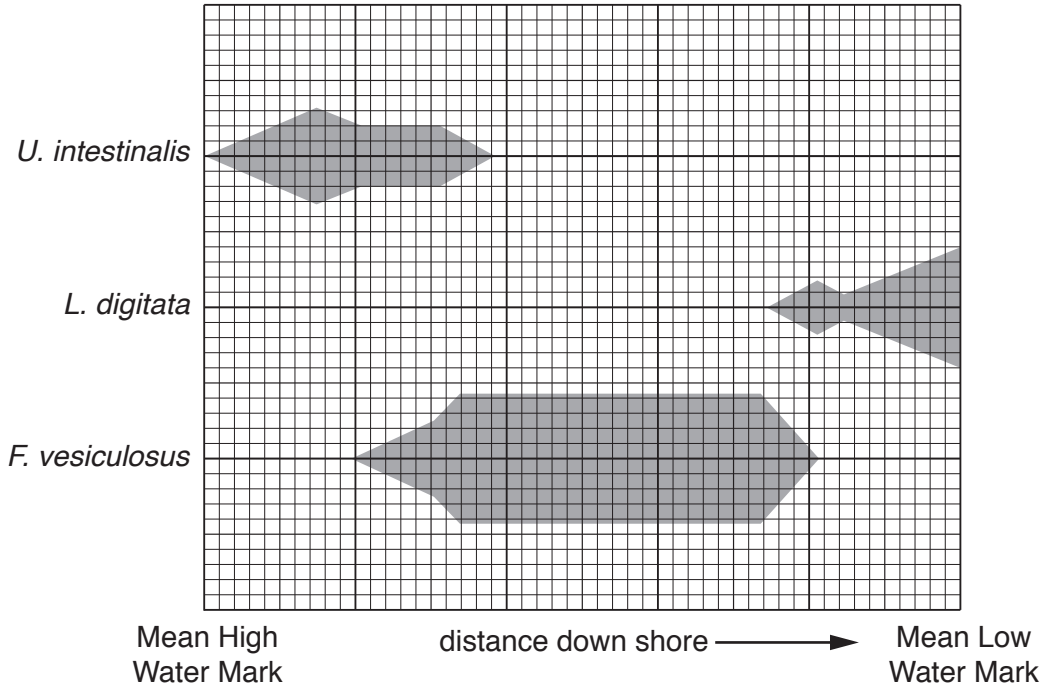


Fig. 5.1

(a) Outline the distribution of each species of alga shown in Fig. 5.1. Use Table 5.1 to help suggest reasons for this distribution.

(i) *U. intestinalis*

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.....

.....

.....[2]

(ii) *F. vesiculosus*

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.....[2]

(iii) *L. digitata*

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.....[2]

(b) Fig. 5.2 shows the oxygen concentration in sea water and fresh water at different temperatures.

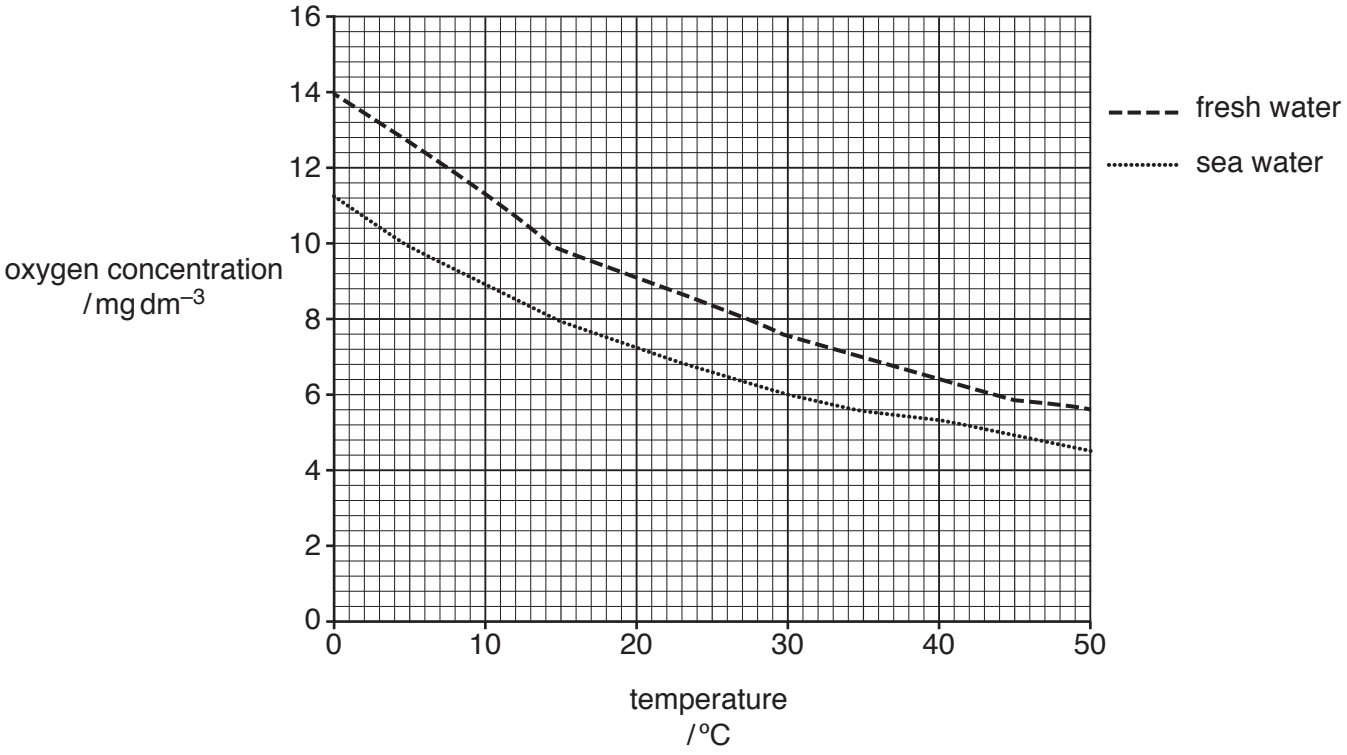

Fig. 5.2

(i) Use Fig. 5.2 to state the relationship between oxygen concentration and temperature of sea water.

.....

.....[1]

(ii) Suggest the implication of this relationship for organisms living in shallow rock pools on a hot day.

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.....[2]

(iii) Use Fig. 5.2 to suggest the possible effects of precipitation on the oxygen concentration in shallow rock pools.

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.....[3]

(c) Explain the effect of evaporation on the salinity of a shallow rock pool.

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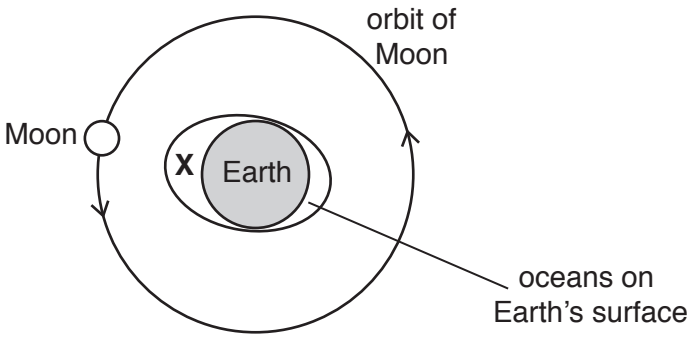
.....[2]

[Total: 14]

6 Fig. 6.1 provides information on the influence of the Moon on ocean tides.



not to scale

Fig. 6.1

(a) (i) Suggest the state of the tide on the Earth's surface at point **X**.

.....[1]

(ii) Explain how the Moon influences the tidal cycle on Earth during one day.

.....

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.....

.....

.....[3]

(b) Explain how the influence of the Sun also affects the tidal cycle on Earth.

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.....

.....

.....[2]

(c) List **three** factors, other than the Sun and Moon, that influence the tidal range.

1 .....

2 .....

3 .....

[3]

[Total: 9]

7 There are numerous parasites of fish.

(a) Define the term *parasite*.

.....

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.....

.....[2]

(b) Fig. 7.1 shows the life cycle of one parasite of fish, the fish eye fluke. This parasite has several hosts and completes its life cycle in the intestines of a fish-eating bird.

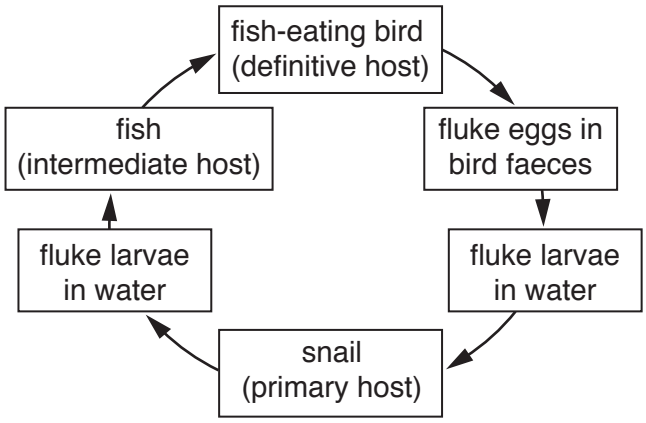

Fig. 7.1

(i) The presence of flukes in fish can lead to reduced vision or even blindness.

Suggest how this may be of benefit to the parasite.

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.....[3]

(ii) Most parasites do not kill their host. With reference to Fig. 7.1, suggest why doing so would be a disadvantage to the fish eye fluke.

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.....[2]

[Total: 7]

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