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Cambridge Assessment International Education

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MARINE SCIENCE **0697/13**

Paper 1 Theory and Data Handling **October/November 2024**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

[Turn over

1 Fig. 1.1 shows the layers of the Earth.

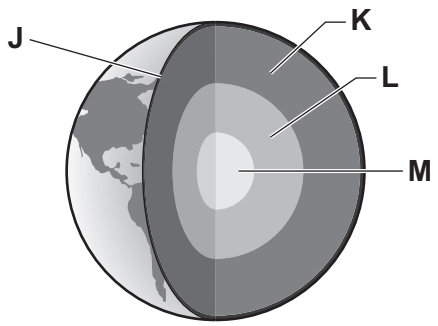

Fig. 1.1

(a) Complete Table 1.1 to give the name of each layer of the Earth and if each layer is solid, liquid or gas. [4]

Table 1.1

label	name	solid / liquid / gas
J	.....	.....
K	.....	.....
L	.....	.....
M	.....	.....

(b) Fig. 1.2 shows three different types of plate boundary labelled **X**, **Y** and **Z**.

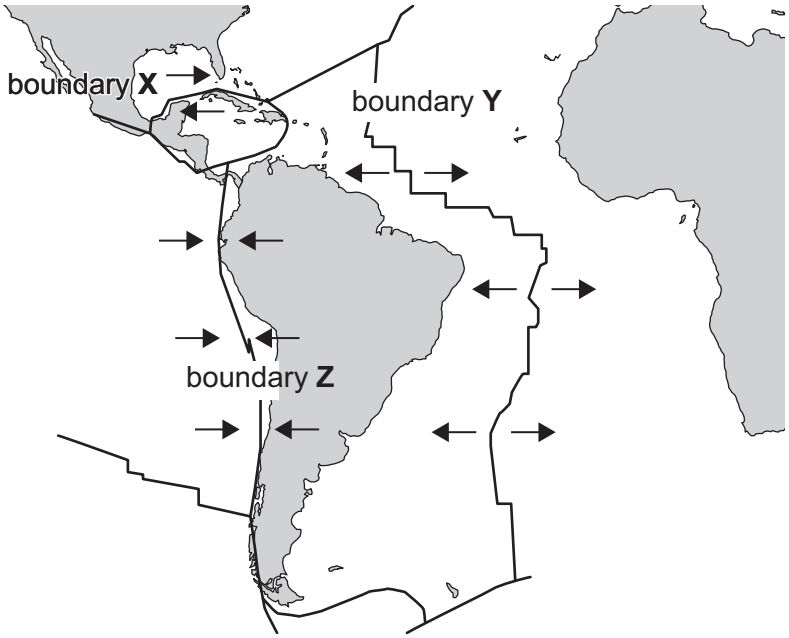

Fig. 1.2

(i) State the name of each type of boundary, **X** and **Y**.

X .....

Y .....

[2]

(ii) Explain how the movement of the plates at boundary **Z** can cause volcanoes to form.

.....

.....

.....

..... [2]

(iii) The movement of plates at boundary **Z** sometimes causes a tsunami to form.

Outline **two** effects of tsunamis on marine ecosystems.

.....

.....

.....

..... [2]

[Total: 10]

2 **(a)** Draw **one** line from each name to its correct definition.

name	definition
	the community and the environment interacting together
community	a group of organisms of one species living in the same area at the same time
habitat	a group of organisms that can reproduce fertile offspring
population	the external biotic and abiotic surroundings of an organism
environment	all the population of different species in one area
	the area where an organism lives and interacts with its environment and other organisms

[4]

(b) Fig. 2.1 shows a pyramid of numbers for a marine food chain.

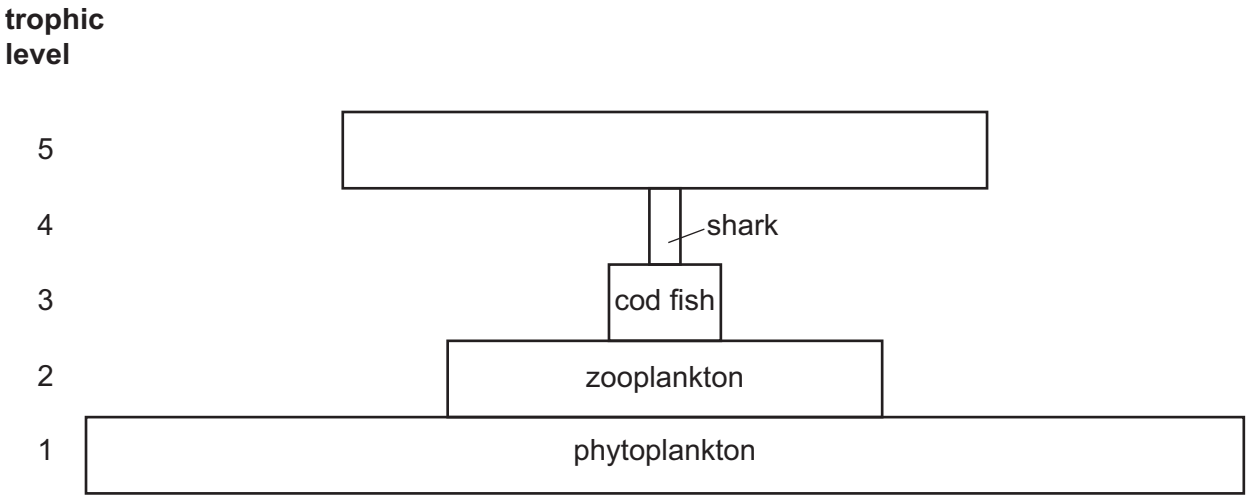

Fig. 2.1

(i) State the name of **two** groups of organisms that may be present in trophic level 1 of this food chain.

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

(ii) State the name of the secondary consumer in this food chain.

..... [1]

(iii) Suggest the type of organism that may be found in trophic level 5.

..... [1]

(iv) State **two** biotic factors that affect the rate of population growth of sharks.

1 .....

2 .....

[2]

[Total: 9]

3 The open ocean is divided into three zones. These are the sunlight zone, the twilight zone and the midnight zone.

(a) Describe why the concentration of oxygen is high in the sunlight zone.

.....

.....

.....

.....

.....

..... [3]

(b) The mean concentrations of carbon dioxide and of oxygen in air and in sea water are shown in Table 3.1.

Table 3.1

gas	mean concentration in air / a.u.	mean concentration in sea water / a.u.
carbon dioxide	416	210 500
oxygen	209 460	6

(i) Compare the mean concentration of carbon dioxide and of oxygen in sea water to their mean concentrations in air.

.....

.....

.....

..... [2]

(ii) In surface water at night, carbon dioxide concentration increases.

Explain this observation.

.....

.....

.....

.....

.....

..... [3]

(c) Fig. 3.1 shows a fish species.

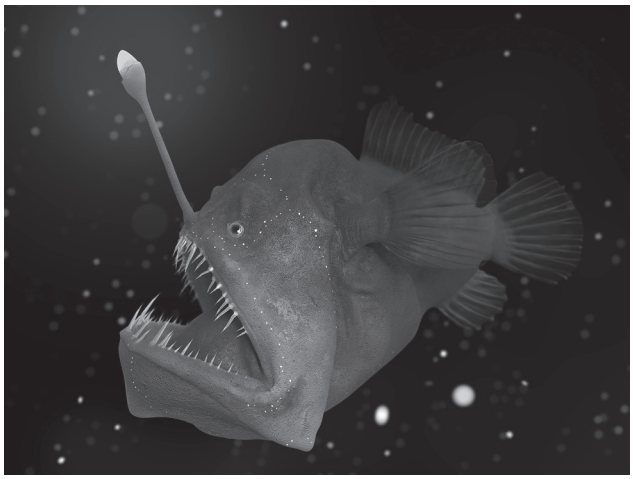

Fig. 3.1

Suggest the zone that this fish lives in **and** support your answer with adaptations visible in Fig. 3.1.

zone .....

.....

.....

.....

.....

.....

.....

[3]

[Total:11]

4 Fig. 4.1 shows a plant cell.

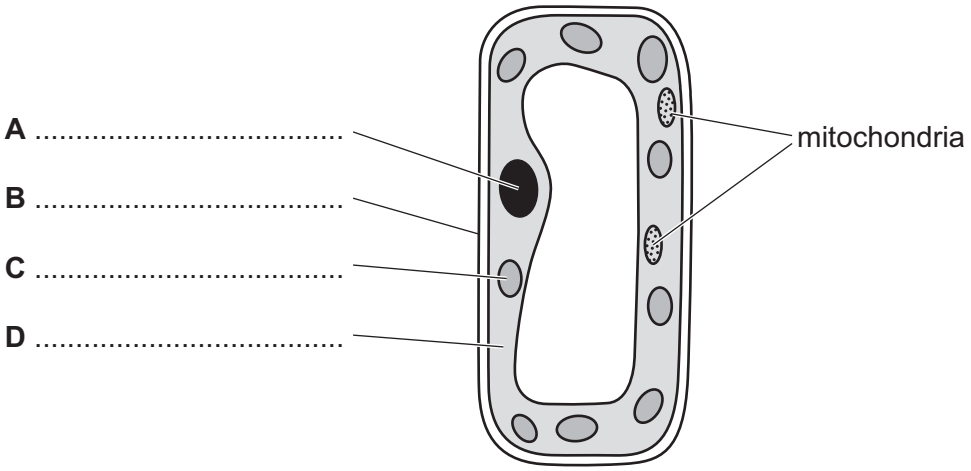

Fig. 4.1

(a) (i) Identify the structures labelled **A**, **B**, **C** and **D** on Fig. 4.1.

Write your answers in the answer spaces on Fig. 4.1. [3]

(ii) State the function of the structure labelled **C**.

.....

..... [1]

(iii) State **one** similarity and **one** difference between the plant cell in Fig. 4.1 and a dinoflagellate cell.

similarity .....

difference .....

[2]

(b) Fig. 4.2 shows a typical seagrass.

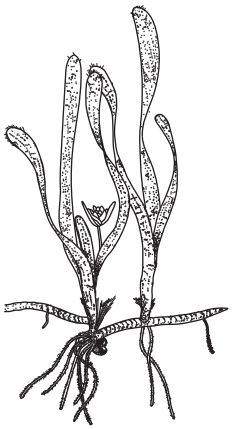

Fig. 4.2

(i) Identify and label a leaf, the roots, a rhizome and a flower on Fig. 4.2. [2]

(ii) For each feature of the seagrass in Fig. 4.2, draw **one** line to its function.

feature	function
	anchors the seagrass to the substrate and absorbs minerals
leaf	keeps the leaves floating
root	the organ of photosynthesis
flower	for asexual reproduction
rhizome	for sexual reproduction
	for protection

[4]

[Total: 12]

5 Fig. 5.1 shows the Niger Delta and the locations of some of the oilfields in the area.

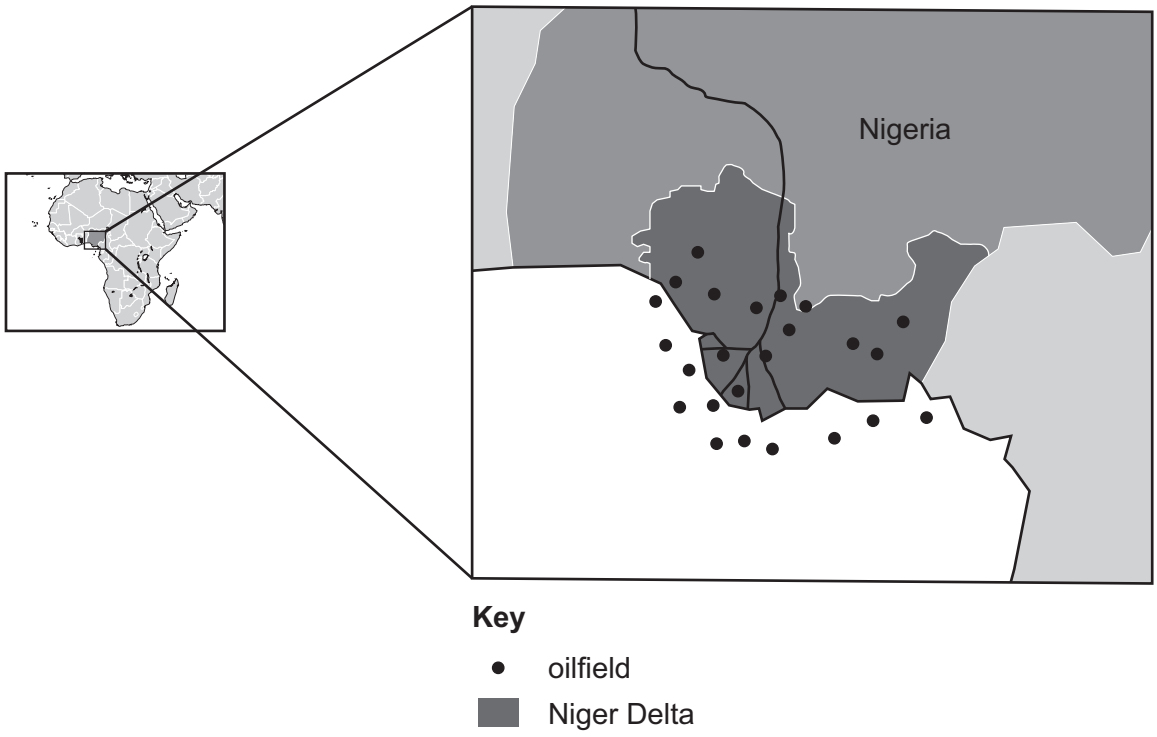

Fig. 5.1

The Niger Delta in Nigeria has one of the largest mangrove forests in the world.

Nigeria exports a large volume of extracted oil from oilfields.

(a) (i) Suggest **two** benefits to Nigeria of a healthy mangrove forest.

.....

.....

.....

..... [2]

(ii) Suggest **one** benefit to Nigeria as a country which extracts oil.

.....

..... [1]

(iii) Explain how the use of extracted oil may contribute to climate change.

.....

.....

.....

.....

.....

..... [3]

(iv) Suggest **two** effects of climate change on estuaries containing mangrove forests.

.....

.....

.....

..... [2]

(v) Some areas of the mangrove forest are damaged by oil spills and leaks.

Name **two** ways the impact of these spills can be reduced.

1 .....

2 .....

[2]

(b) Local conservationists work to restore the areas of mangrove forest damaged by oil spills.

They collect young mangrove tree plants attached to the mature mangrove trees and grow them on in ideal conditions.

They replant the young trees in areas where the mangrove forest has died.

(i) Suggest **one** reason why this is a form of aquaculture.

.....

..... [1]

(ii) Explain **one** reason why this project may **not** be successful.

.....

.....

.....

..... [2]

[Total: 13]

6 The water cycle occurs in all parts of the World Ocean.

(a) Explain why rates of evaporation are different between polar and tropical areas of the World Ocean.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(b) Rivers carry many nutrients to the ocean.

Describe the process that causes nutrients at high concentrations in the surface waters to reach the deeper parts of the ocean.

.....

.....

.....

..... [2]

(c) **(i)** Every year, 25 000 000 tonnes of plastic enter the oceans.

Plastic bottles make up 6% of this.

Calculate the number of tonnes of plastic bottles entering the oceans each year.

Show your working.

..... [2]

(ii) Plastic bags also enter the oceans from rivers.

Some sea life may become tangled in the plastic bags and drown.

Describe **two** other impacts of plastic bags on marine ecosystems.

.....

.....

.....

..... [2]

[Total: 10]

7 Fig. 7.1 shows the direction of the wind in the Pacific Ocean in a normal year and in a year when an El Niño effect is occurring.

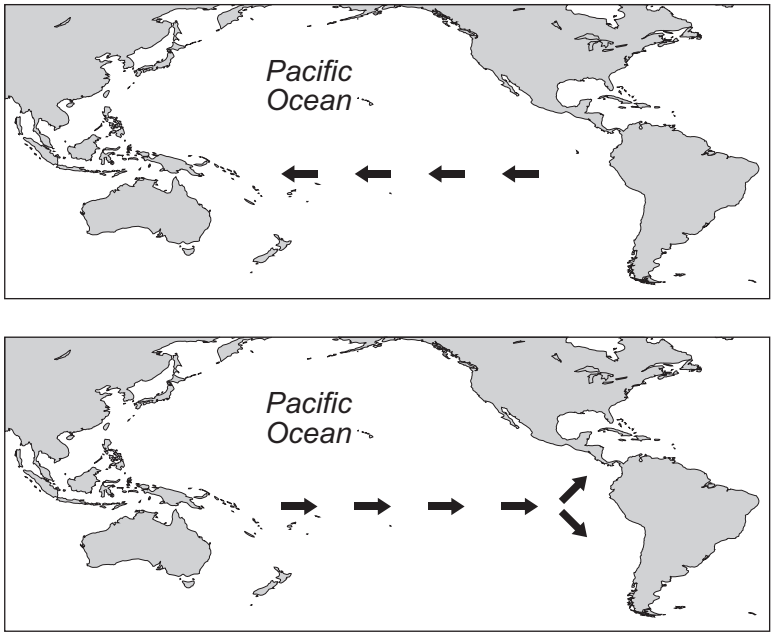

Fig. 7.1

(a) Outline the formation of El Niño.

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.....

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.....

.....

..... [3]

(b) List **three** effects of El Niño and where these effects occur.

1 .....

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2 .....

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3 .....

.....

[3]

[Total: 6]

8 Fig. 8.1 shows the migration routes of bluefin tuna.

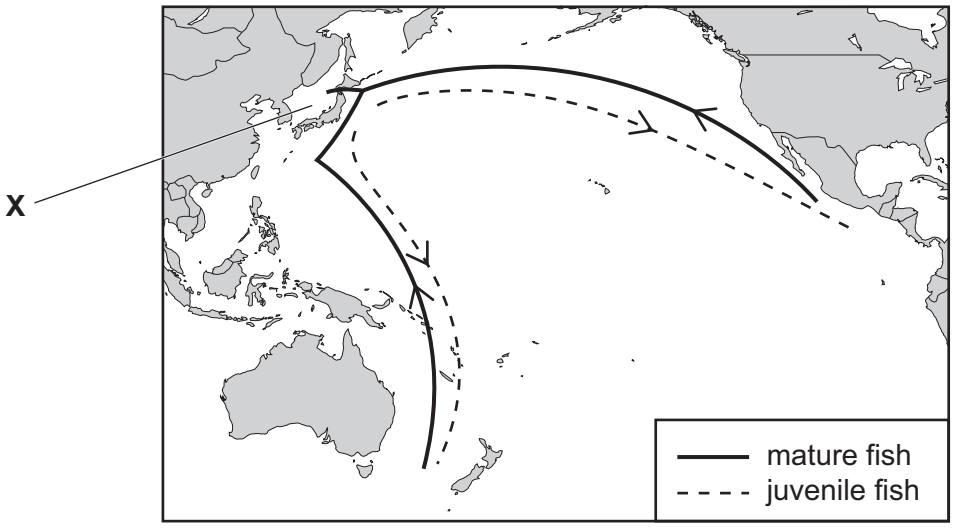

Fig. 8.1

(a) (i) Identify the main ocean this migration occurs in.

..... [1]

(ii) The area labelled **X** is the Sea of Japan.

Describe how a sea is different from an ocean.

.....

.....

..... [2]

(b) Discuss how and why bluefin tuna migrate.

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..... [6]

[Total: 9]

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