Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

8575114198

MARINE SCIENCE **0697/01**

Paper 1 Structured **May/June 2022**

1 hour 30 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 **16** pages. Any blank pages are indicated.

DC (KN) 310948

[Turn over

Answer **all** questions.

1 Fig. 1.1 shows a food web for a seagrass bed.

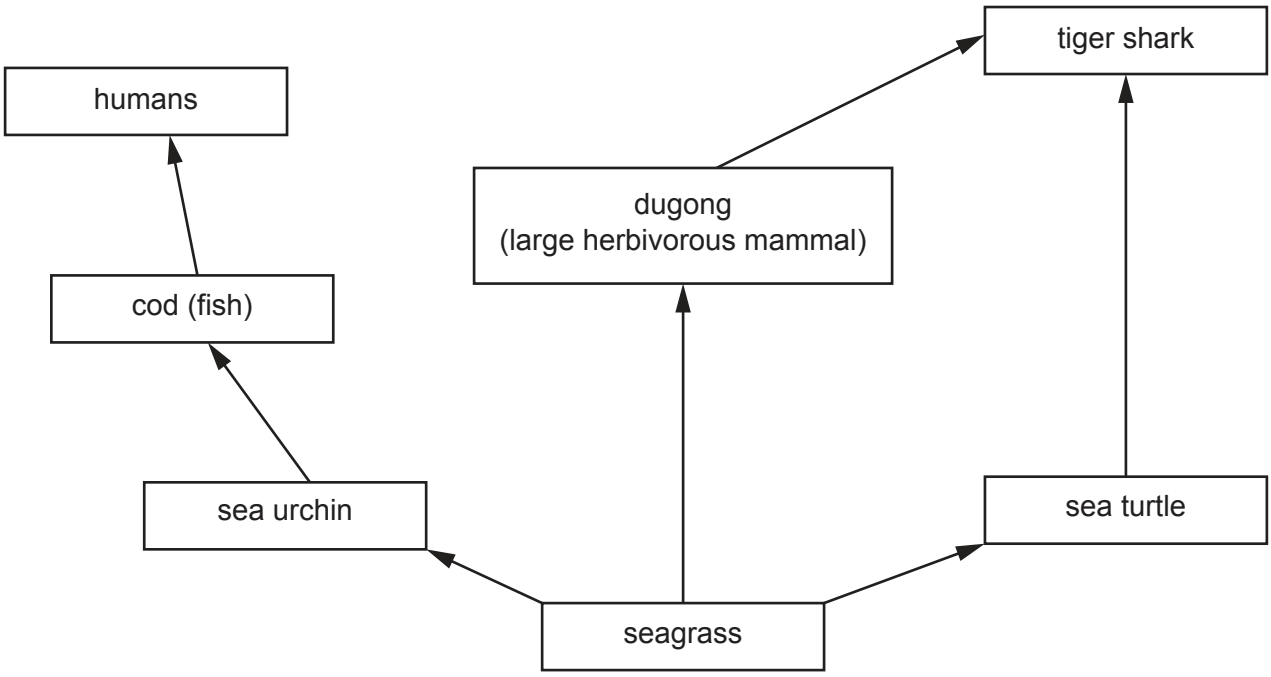

Fig. 1.1

(a) (i) Seagrass is a primary producer.
Explain what is meant by a primary producer.

.....

..... [1]

(ii) State what the arrows in the food web represent.

.....

..... [1]

(b) Explain the long-term effect on the dugong population of fishing for cod above the maximum sustainable yield.

.....

.....

.....

.....

.....

..... [3]

(c) Seagrass needs inorganic nutrients to grow well.

State the role of the following in seagrass.

nitrates .....

phosphates .....
[2]

(d) Outline the reasons why energy is lost between each trophic level in any food chain.

.....

.....

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.....

.....

..... [3]

[Total: 10]

2 **(a)** Fig. 2.1 shows three different fishing methods, **A**, **B** and **C**.

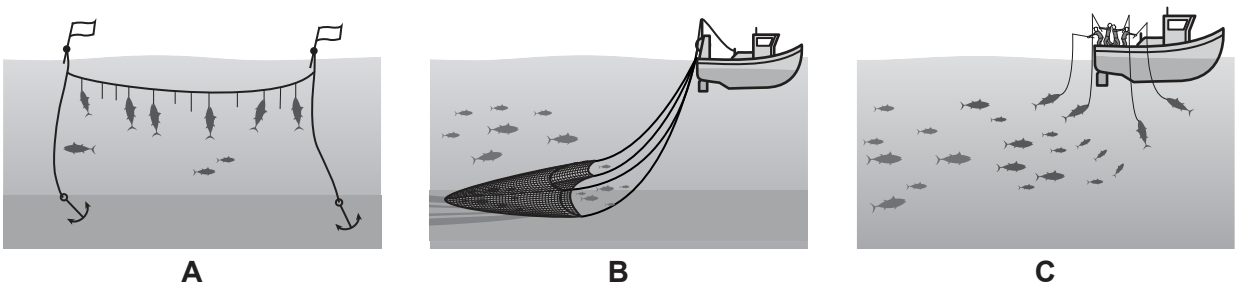

Fig. 2.1

(i) State the name of each fishing method.

A .....

B .....

C .....

[3]

(ii) State **one** ecological problem with the method shown in **B**.

..... [1]

(b) Fish Aggregating Devices (FADs) increase the fish catch in areas near the FAD.

(i) There are environmental concerns about the use of FADs.

One recommendation to reduce the environmental impact is to use hanging ropes made from natural materials instead of hanging mesh made from nylon.

Suggest **two** reasons for this.

1 .....

.....

2 .....

.....

[2]

(ii) Purse seine boats fish intensively around FADs.

Describe **two** environmental impacts of this fishing.

1 .....

.....

2 .....

.....

[2]

(c) Fig. 2.2 shows three boat-building materials and some advantages and disadvantages of their use.

Draw **one** line from each material in the middle column to **one** advantage in the column on the left and **one** disadvantage in the column on the right.

advantage	**material**	disadvantage
easily moulded	**wood**	breaks easily in a collision
renewable	**aluminium**	corrodes in seawater
dent resistant	**fibreglass**	swells and shrinks in water

Fig. 2.2

[3]

[Total: 11]

3 Fig. 3.1 shows the surface of the Earth and the boundaries of sections of the Earth's crust.

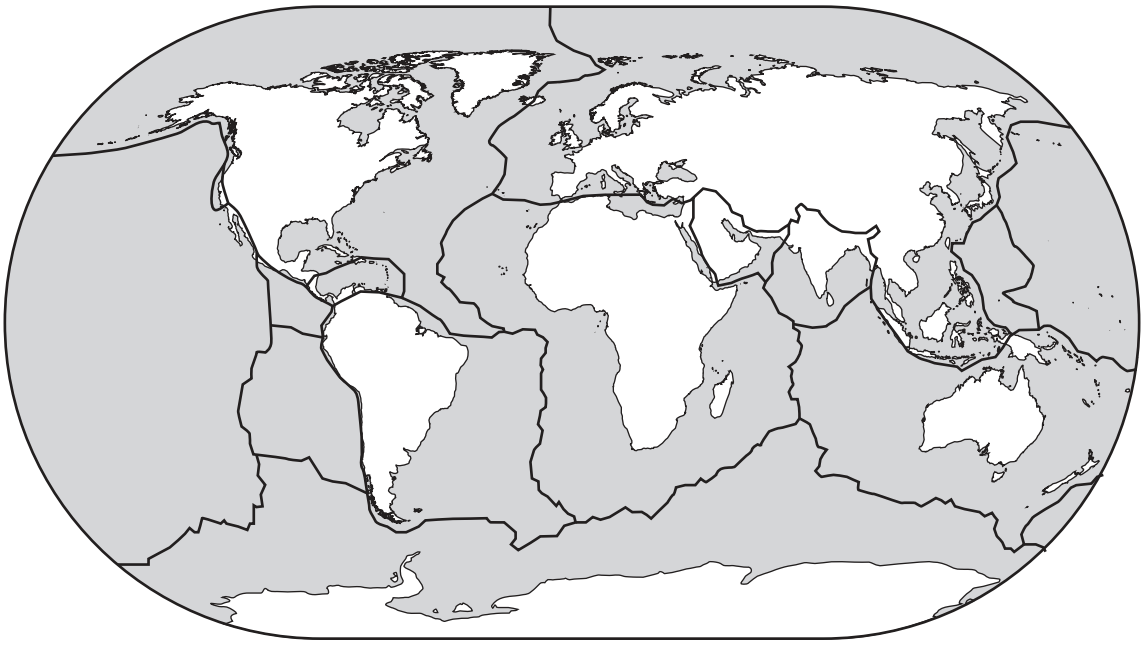

Fig. 3.1

(a) (i) State the name given to these sections of the Earth's crust shown in Fig. 3.1.

..... [1]

(ii) Describe how the movement of these sections can lead to the formation of a tsunami.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(b) Fig. 3.2 shows an early-warning system for tsunamis.

To detect tsunamis, early-warning tsunameters are placed on the sea bed. The tsunameters communicate with a surface buoy.

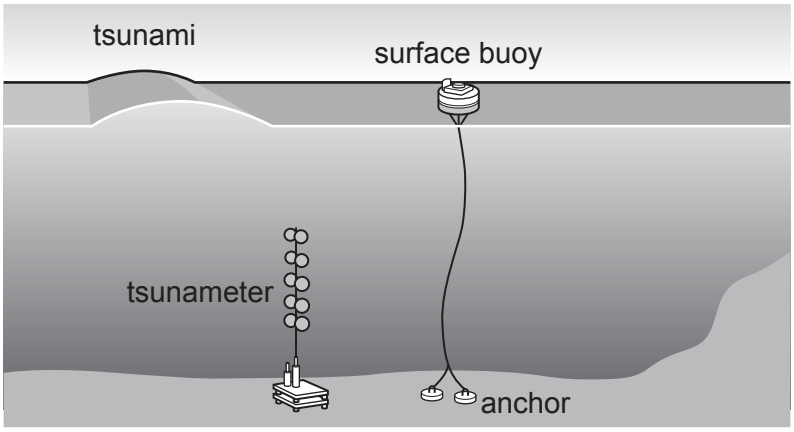

Fig. 3.2

Suggest how the tsunameter is able to detect a tsunami wave passing over it.

.....

.....

.....

..... [2]

[Total: 7]

4 **(a)** Oysters are edible bivalve molluscs that can be fished from the sea bed by capture fishery or grown by aquaculture.

(i) State the name of another group of marine molluscs.

..... [1]

(ii) Table 4.1 shows the production from capture fishery and aquaculture of oysters in 1980 and 2017.

Table 4.1

production method	production of oysters / thousand tonnes	
	1980	**2017**
capture fishery	200	147
aquaculture	640	639
TOTAL	840	

Use Table 4.1 to calculate the total production of oysters in 2017.

..... thousand tonnes [1]

(iii) Suggest **two** reasons why production of oysters has remained almost constant between 1980 and 2017.

1 .....

.....

2 .....

.....

[2]

(b) **(i)** Oyster aquaculture is considered to be extensive.

Explain the difference between extensive and intensive aquaculture.

.....

.....

.....

..... [2]

(ii) State the name of **one** species that is commonly farmed intensively.

..... [1]

(iii) State **one** environmental impact of an intensive aquaculture operation.

.....

..... [1]

(c) Fish species that are used for aquaculture can be genetically engineered for faster growth.

The following stages, **A**, **B**, **C**, **D** and **E**, are involved in genetic engineering of fish.

A **growth-promoting gene identified from a fast-growing fish species**

B **egg hatches and fish reaches market size faster**

C **growth-promoting gene extracted from a fast-growing fish species**

D **growth-promoting gene inserted into a plasmid**

E **altered plasmid inserted into fish egg**

Place the letters in the correct order for genetic engineering of fish.

First stage ⟶ Fifth stage

....

[3]

[Total: 11]

5 Fig. 5.1 shows a cross-section of a coral polyp.

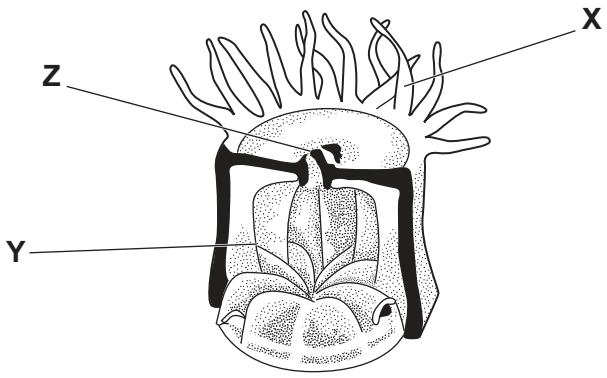

Fig. 5.1

(a) Complete Table 5.1 with the names and functions of the structures **X**, **Y** and **Z** labelled in Fig. 5.1.

Table 5.1

structure	name	function
X	.....	.....
Y	.....	.....
Z	.....	.....

[6]

(b) Coral polyps have two methods of obtaining nutrition.

(i) Describe the use of stinging cells in obtaining nutrition.

.....

.....

.....

..... [2]

(ii) Coral polyps may contain zooxanthellae.

Explain how zooxanthellae provide nutrition to the polyp.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(c) Coral reefs may be mined to be used as building material.

Explain the environmental impact of coral mining on fisheries.

.....

.....

.....

.....

.....

..... [3]

[Total: 15]

6 Japan has a large market for diamondback squid.

(a) Explain the meaning of the term market.

.....

..... [1]

(b) The catch of diamondback squid in Japan has decreased.

(i) Suggest **one** reason for this decrease in catch.

.....

..... [1]

(ii) Explain the effect of this decrease in catch on the price of diamondback squid in Japan.

.....

.....

.....

..... [2]

(c) **(i)** Other countries in the region want to exploit their natural economic resources within their Exclusive Economic Zone (EEZ).

Describe what is meant by a natural economic resource.

.....

.....

.....

..... [2]

(ii) As a country develops a new diamondback squid fishery within their EEZ, both public and private ownership may work together.

Describe the role of public ownership.

.....

.....

.....

..... [2]

(d) Suggest **three** methods a government can use to ensure the development of their diamondback squid fishery remains sustainable.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

[Total: 11]

7 Human pollution can cause problems in the marine environment.

There are 5 main types of pollutant. These are shown in Table 7.1.

Table 7.1

pollutant	human source
carbon dioxide	.....
plastics	.....
excess nutrients	.....
noise	.....
toxins	oil spill

(a) Complete Table 7.1 by suggesting one human source for each type of pollutant.
One has been completed for you. [4]

(b) Explain the impact of litter on marine organisms.

.....

.....

.....

.....

.....

..... [3]

(c) Oil is harmful to many marine organisms.

State **two** pollution control measures that can be used to reduce the effect of oil spills at sea.

1 .....

.....

2 .....

.....

[2]

[Total: 9]

8 State the kingdom and group of each of the three organisms described below.

(a) Organism 1

- produces rhizomes
- cells contain chlorophyll
- cells have a nucleus
- cells have a cell wall
- cells have a vacuole

Kingdom .....

Group .....

[2]

(b) Organism 2

- has a carapace
- has multiple legs
- has antennae
- cells have a nucleus
- cells have a cell membrane

Kingdom .....

Group .....

[2]

(c) Organism 3

- has a holdfast
- has red blades
- cells have a nucleus
- cells contain a red pigment for photosynthesis

Kingdom .....

Group .....

[2]

[Total: 6]

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