Cambridge IGCSE™

CANDIDATE
NAME

CENTRE
NUMBER

CANDIDATE
NUMBER

MARINE SCIENCE **0697/02**

Paper 2 **May/June 2021**

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 60.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages. Any blank pages are indicated.

Section A

1 Table 1.1 shows the annual global tuna catch every five years between 1985 and 2015.

Table 1.1

year	annual global tuna catch/million tonnes
1985	1.7
1990	2.1
1995	3.0
2000	3.5
2005	3.3
2010	3.2
2015	3.1

(a) (i) Plot a graph to show the annual global tuna catch between 1985 and 2015.

Join your points with ruled, straight lines.
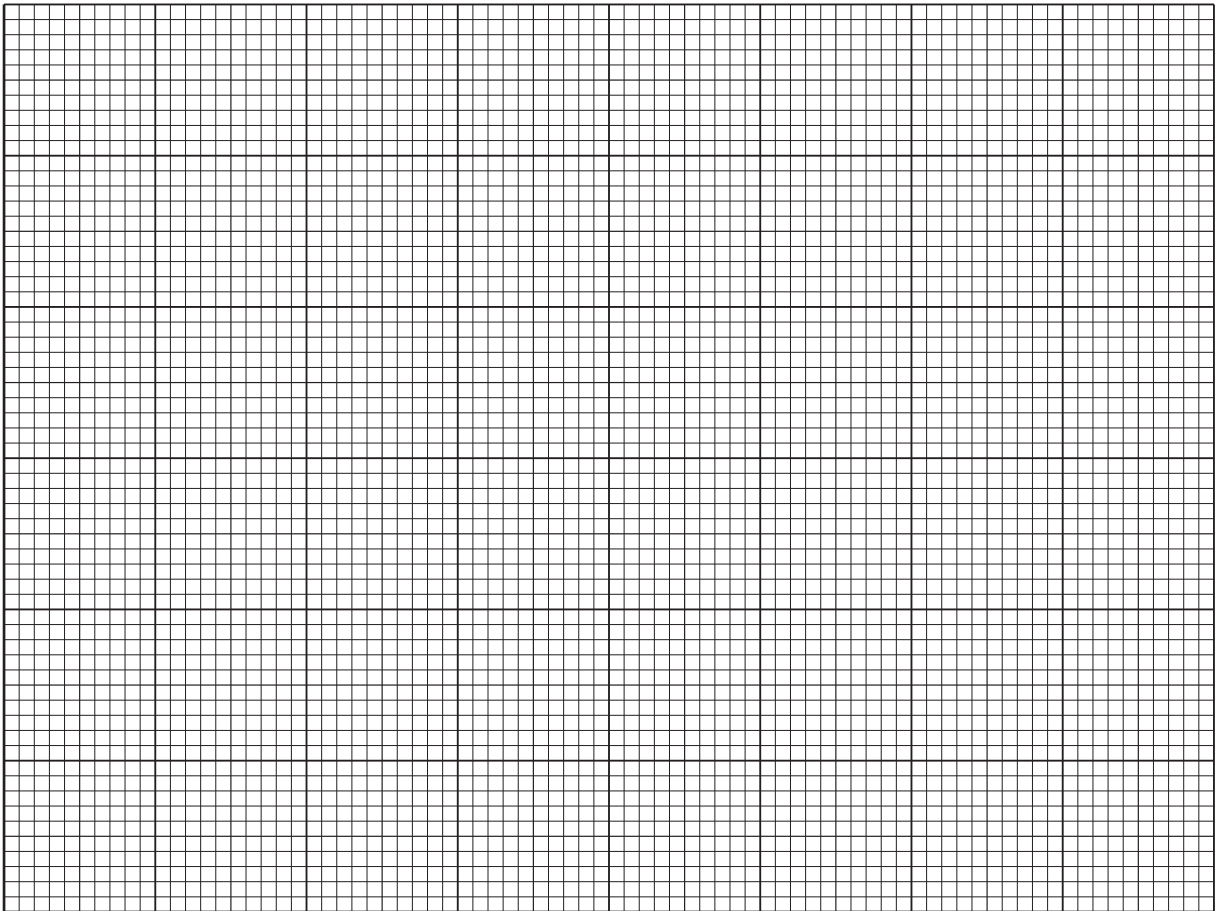
[5]

(ii) Outline the trends in annual global tuna catch between 1985 and 2015.

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(iii) Suggest **three** reasons for the change in annual global tuna catch between 2000 and 2015.

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(b) The global demand for tuna in 2025 is predicted to be greater than the catch.

Tuna aquaculture is being developed to meet the demand.

Kingfish aquaculture is being used as a model for tuna aquaculture.

Gross annual income is the total amount of money received from sales before costs.

Table 1.2 shows the gross annual income from kingfish sales and the annual cost of labour and maintenance for kingfish aquaculture business.

Table 1.2

gross annual income from kingfish sales /USD ($)	annual cost of labour and maintenance /USD ($)
550 000	425 000

(i) Use Table 1.2 to calculate the annual profit of the kingfish aquaculture business.

.... USD ($) **[1]**

(ii) The cost to start up a kingfish aquaculture business is estimated to be $500 000.

Calculate the number of years it will take the kingfish aquaculture business to recover the start-up cost.

.... years **[1]**

(iii) Suggest **three** factors that could increase the length of time taken to recover the start-up cost.

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[3]

[Total: 15]

2 Fig. 2.1 shows a food chain.

algae → damselfish → lionfish → reef shark

Fig. 2.1

(a) Draw a pyramid of biomass for the food chain shown in Fig. 2.1.

[2]

(b) Some species of damselfish shelter in coral reefs. These damselfish feed on algae that grows over the surface of photosynthetic coral polyps. This is an example of symbiosis.

(i) Explain how the ecological relationship between the damselfish and the coral shows symbiosis.

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Fig. 2.2 shows part of a food web on a coral reef.

algae $\longrightarrow$ damselfish $\longrightarrow$ lionfish $\longrightarrow$ reef shark

coral polyp $\longrightarrow$ parrotfish
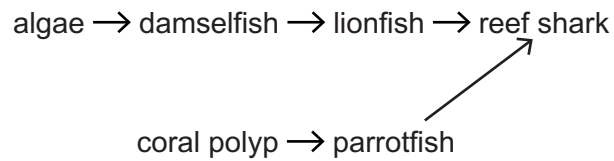
Fig. 2.2

(ii) Use Fig. 2.2 to explain why coral mining decreases the biodiversity of this coral reef.

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(c) A student investigates the effect of predator number on the shoaling behaviour of damselfish. The student is given plastic models of damselfish predators.

The student places five damselfish into a tank.

The mean distance between the damselfish is calculated.

The mean swimming speed of the damselfish is also calculated.

This is repeated with different numbers of predator models in the tank.

The results are shown in Table 2.1.

Table 2.1

number of predator models	mean distance between damselfish / mm	mean swimming speed of damselfish / mm per s
0	52	24
1	22	……
2	18	36
3	17	35

(i) The swimming speeds of five damselfish when one predator model is present are shown in Table 2.2.

Table 2.2

swimming speed/mm per s
29
31
28
29
30

Calculate the mean swimming speed for the five damselfish and write your answer in the space in Table 2.1.

[2]

(ii) Describe the effect of number of predator models on the mean distance between damselfish.

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(iii) Suggest an explanation for the behaviour of the damselfish in the experiment.

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[Total: 15]

Section B

3 Sea cucumbers are an important commercial catch that are often caught by beam trawling.

(a) Name the external features of a sea cucumber and describe their functions.

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(b) Describe the method and environmental impacts of beam trawling.

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(c) Describe methods of conservation that may be used to protect sea cucumbers.

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[Total: 15]

4 (a) (i) Explain the role of exclusive economic zones (EEZs).

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(ii) Name **two** international organisations involved in fisheries management and conservation, and outline their aims.

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(b) Discuss how different factors affect the price of seafood products.

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[Total: 15]

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