Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

0746764366

MARINE SCIENCE **5180/02**

Paper 2 **October/November 2020**

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. Blank pages are indicated.

DC (ST/CT) 183512/2

[Turn over

Section A

Answer **both** questions in this section.

Write your answers in the spaces provided.

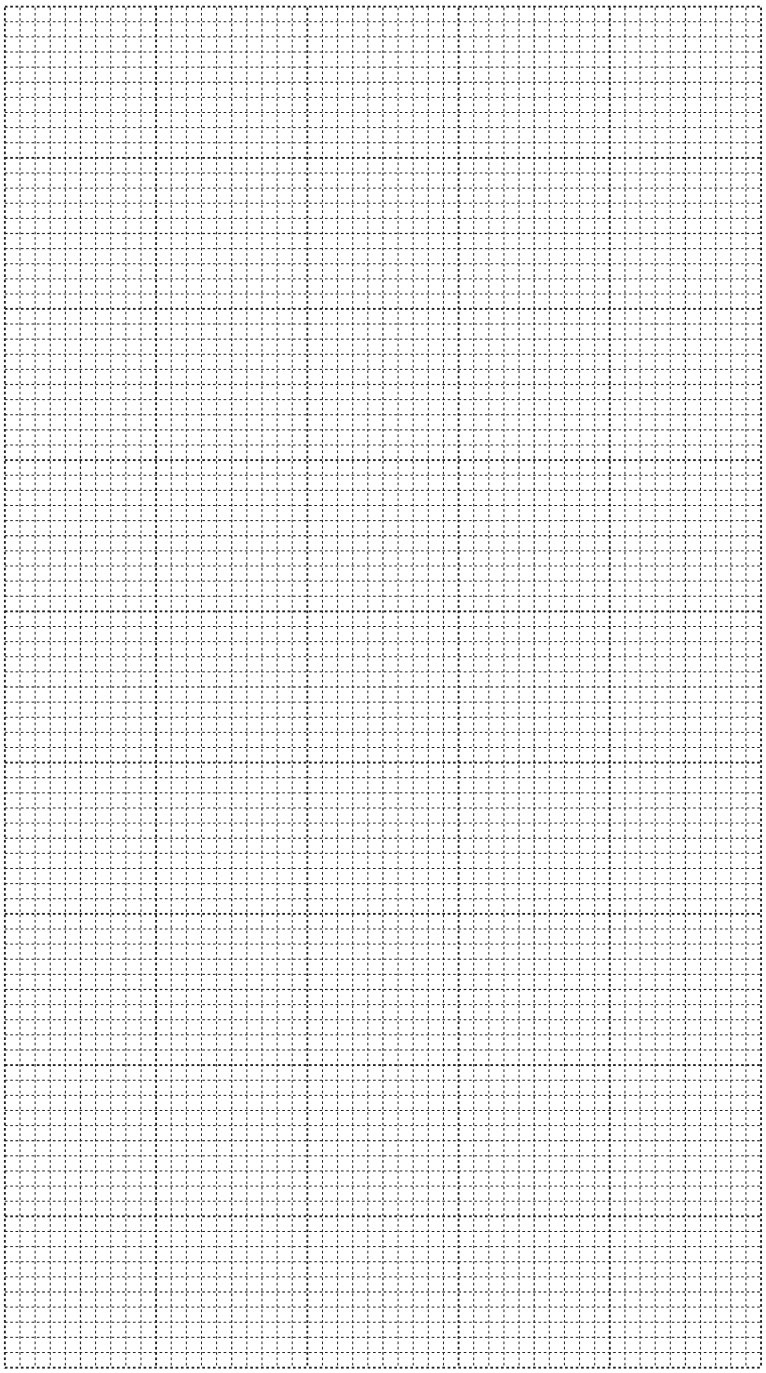
1 The annual catch of yellowfin tuna from the Indian Ocean for every two years between 1999 and 2007 is shown in Table 1.1.

Table 1.1

year	annual catch / million kg
1999	172
2001	164
2003	156
2005	102
2007	98

(a) (i) Draw a line graph to show the change in annual catch over time.

Join your points with ruled, straight lines.



[4]

(ii) Describe the trend in annual catch over time.

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..... [1]

(b) The annual maximum sustainable yield for yellowfin tuna for this period was estimated to be 113 million kilograms.

(i) State the meaning of the term *maximum sustainable yield*.

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..... [1]

(ii) Suggest **three** reasons for the trend in annual catch over time.

1 .....

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2 .....

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3 .....

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[3]

(c) To monitor the fish stocks, scientists calculated the catch per unit effort for each year. They used the following formula:

catch per unit effort = catch ÷ fishing effort

Table 1.2 shows the catch per unit effort for each year.

Table 1.2

year	catch per unit effort / kg per boat day
1999	300
2001	280
2003	240
2005	230
2007	250

The fishing effort was defined as the estimated number of days spent at sea by all the boats in the fishing fleet.

(i) Use Table 1.1 and Table 1.2 to calculate the fishing effort in 2007.

Include the unit with your answer.

1 million kg = 1 000 000 kg

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[3]

(ii) Suggest **one** reason for the change in catch per unit effort between 2005 and 2007.

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..... [1]

(iii) Catch per unit effort was measured in kilograms per boat day.

Catch per unit effort may not be an accurate measure of the sustainable exploitation of yellowfin tuna stocks. Suggest **two** reasons why it may **not** be an accurate measure.

1 .....

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2 .....

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[2]

[Total: 15]

2 Fig. 2.1 shows a marine food chain. The concentration of a chemical, PCB, found in the organisms at each trophic level is also shown.

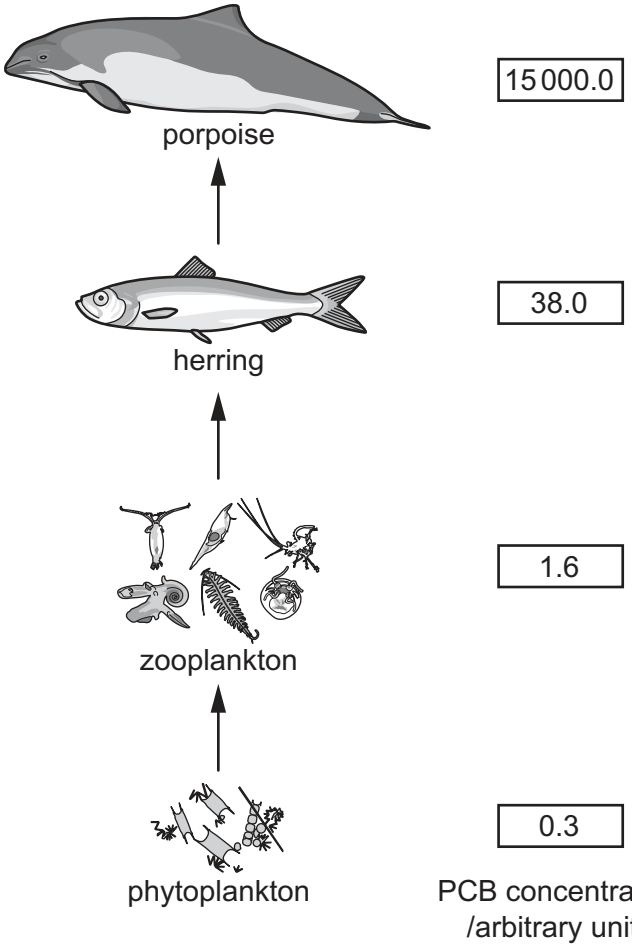

Fig. 2.1

(a) (i) Name the primary producer in the food chain shown in Fig. 2.1.

..... [1]

(ii) Name the organism in the third trophic level of the food chain shown in Fig. 2.1.

..... [1]

(iii) Cod is a fish that feeds on herring.

Porpoise eat cod.

Use this information to add cod to the food chain shown in Fig. 2.1. [2]

(b) **(i)** Describe how the concentration of PCB changes as it passes along the food chain shown in Fig. 2.1.

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..... [1]

(ii) Suggest why the concentration of PCB changes as it passes along the food chain shown in Fig. 2.1.

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..... [2]

(c) It is estimated that the phytoplankton receive 1 500 000 kJ per m^2 per year of light energy from the Sun. They are able to use 2% of this energy in photosynthesis.

(i) Calculate the energy used by the phytoplankton in photosynthesis.

..... kJ per m^2 per year
[1]

(ii) Suggest **two** reasons why not all the light energy available is used by the phytoplankton in photosynthesis.

1 .....

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2 .....

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[2]

(d) Plastic litter that is discarded into the ocean breaks down into small pieces called microplastics. The temperature of the water is one factor that affects the rate of break down of plastic into microplastics.

Fig. 2.2 shows the effect of temperature on the time taken to break down a 0.5 g plastic sheet into microplastics.

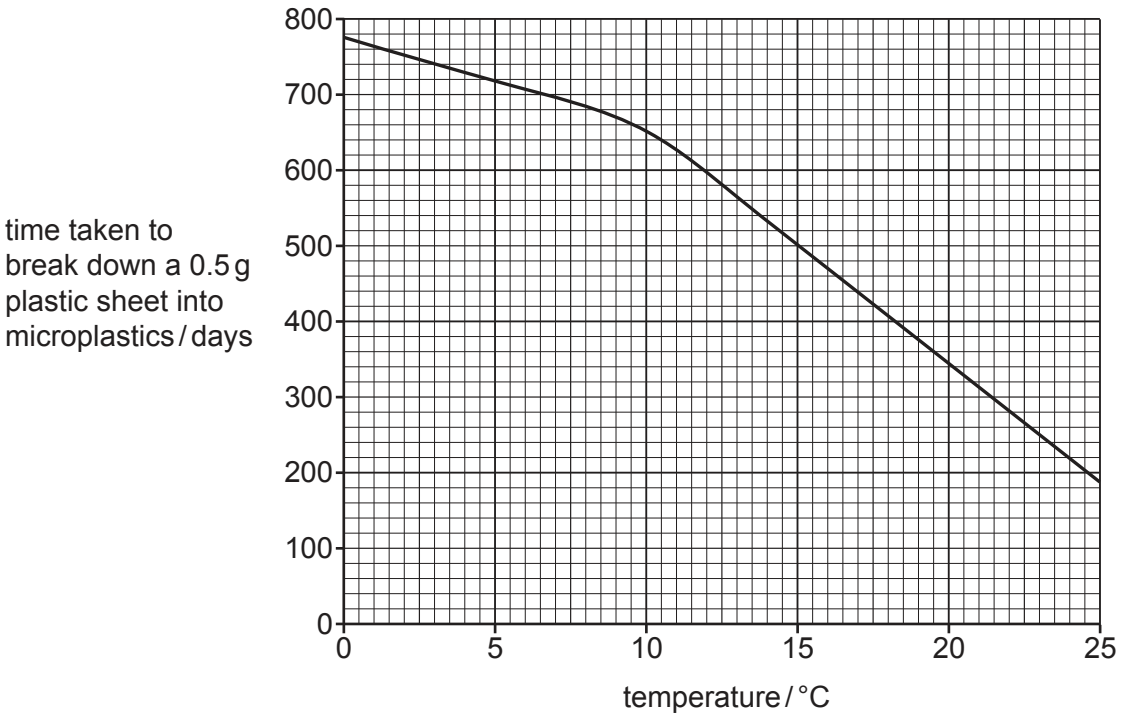

Fig. 2.2

(i) Use Fig 2.2 to determine the time taken to break down a 0.5 g plastic sheet into microplastics, at a temperature of 8 °C.

Show clearly on Fig. 2.2 how you determined your answer.

..... days
[2]

(ii) The conditions in the surface water are very different from the conditions in deep water.

Suggest **three** reasons why plastic sheets break down into microplastics faster in surface water compared to in deep water.

1 .....

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2 .....

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3 .....

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[3]
[Total: 15]

Section B

Answer **both** questions in this section.

Write your answers in the spaces provided.

3 **(a)** Discuss the advantages **and** disadvantages of marine ecotourism.

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..... [7]

(b) Outline the Darwin-Dana-Daly theory of coral atoll formation.

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..... [4]

(c) Explain the formation of a tsunami.

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..... [4]

[Total: 15]

4 **(a)** Explain what is meant by the term *seamanship*.

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(b) Describe the method **and** environmental impacts of pole-and-line fishing.

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(c) Describe the methods by which fish are processed and preserved.

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..... [8]

[Total: 15]