Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	

CENTRE NUMBER		CANDIDATE NUMBER	

MARINE SCIENCE **5180/02**

Paper 2 **October/November 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.

Section A
Answer **both** questions in this section.
Write your answers in the spaces provided on the Question Paper.

Section B
Answer **both** questions in this section.
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 **11** printed pages and **1** blank page.

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[Turn over

Section A

Answer **both** questions in this section.

Write your answers in the spaces provided.

1   A Marine Protected Area (MPA) was set up off the coast of South Africa in 1990.

The total catch of seabream from areas of ocean close to the MPA were recorded over a period of ten years. The results are shown in Table 1.1.

Table 1.1

year	seabream catch/kg
1990	200
1992	500
1994	800
1996	1200
1998	1300
2000	1350

(a) (i)   State what is meant by the term *Marine Protected Area*.

....

....[1]

(ii) Draw a bar chart of the data in Table 1.1 on the grid provided.
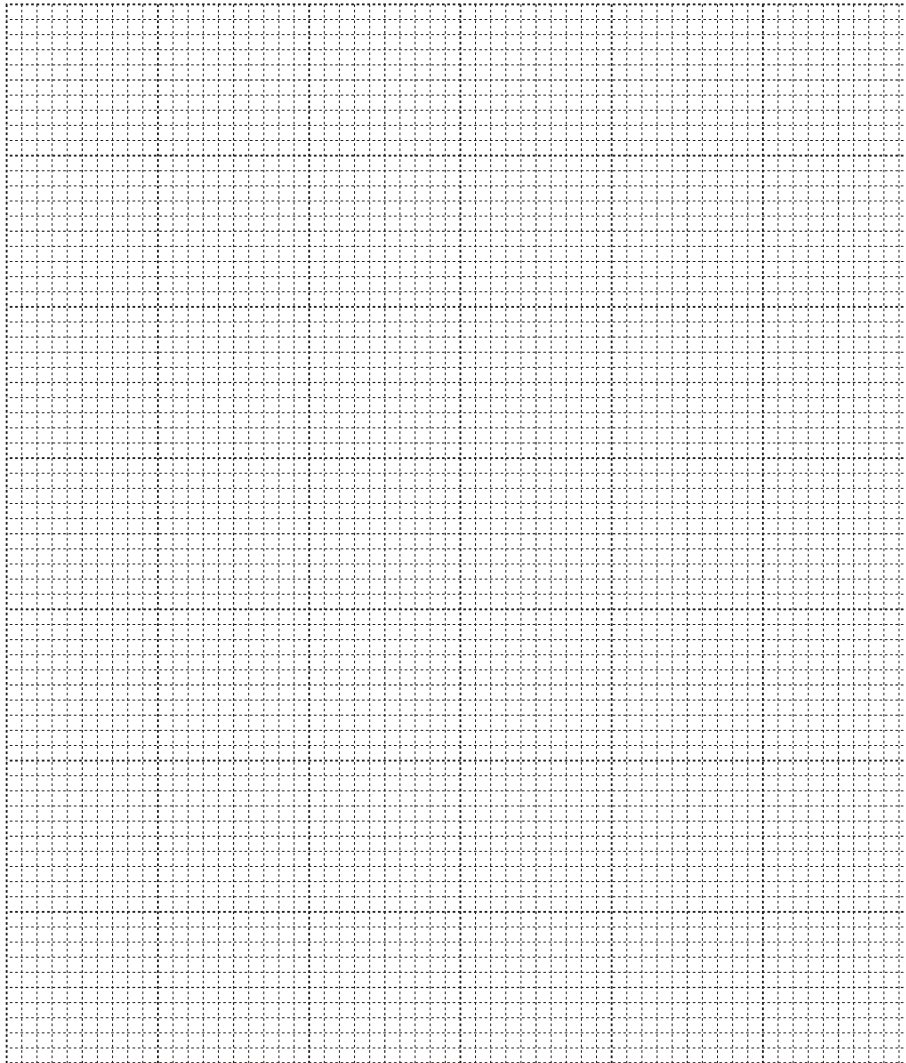
[4]

(b) (i) Within which two-year period was there the largest change in catch?

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

(ii) Calculate the change in seabream catch between 1990 and 2000.

Show your working and state your units.

....

[2]

 [Turn over

    (iii) Describe the change in seabream catch between 1990 and 2000.

....

....

....

....[2]

(c) Suggest **three** reasons for the change in seabream catch in areas close to the MPA.

1 ....

....

2 ....

....

3 ....

....
                                                                                     [3]

(d) Suggest one advantage **and** one disadvantage of MPAs to fishermen.

    advantage ....

....

    disadvantage ....

....
                                                                                      [2]

                                                                                                [Total: 15]

5

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2 Fig. 2.1 shows a marine food chain and the total biomass at each trophic level.

| tuna |
| 5 g per m^2 |

| herring |
| 30 g per m^2 |

| zooplankton |
| 100 g per m^2 |

| phytoplankton |
| 400 g per m^2 |
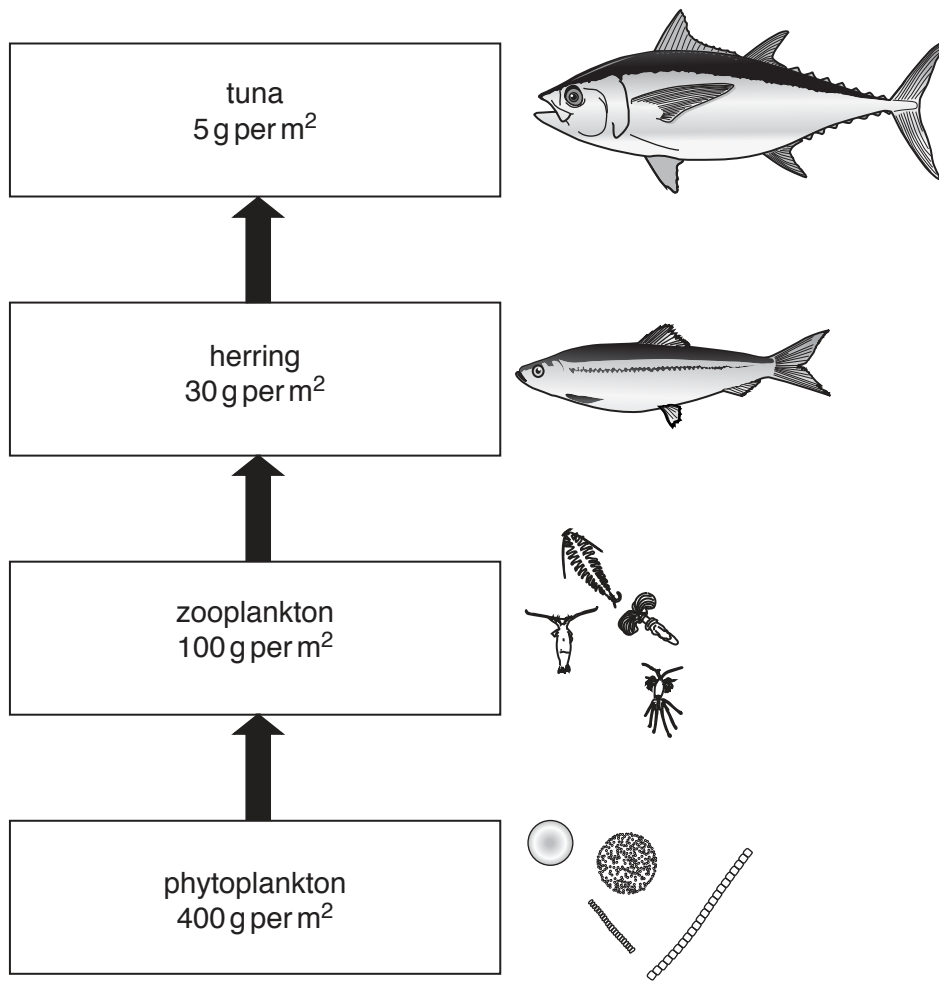
Fig. 2.1

(a) (i) Use Fig. 2.1 to name:

a producer ....

a carnivore at trophic level three ....

[2]

(ii) Predict the effect of overfishing of tuna on the population of zooplankton. Explain the reason for this.

prediction ....

....

explanation ....

....

....

....

[3]

(iii) Draw a labelled pyramid of biomass for this food chain.

[2]

(b) Table 2.1 shows the total energy in each trophic level each year.

Table 2.1

trophic level	total energy/kJ per m^2 per year
phytoplankton	250 000
zooplankton	23 000
herring	1800
tuna	150

(i) The percentage of energy that is lost during the transfer between herring and tuna can be calculated using the following equation.

$$\text{percentage of energy lost} = \left(\frac{\text{energy in herring} - \text{energy in tuna}}{\text{energy in herring}} \right) \times 100$$

Calculate the percentage of energy that is lost during the transfer between herring and tuna.

Show your working.

....%

[2]

(ii) Explain why the percentage of energy lost between herring and tuna is high.

....

....

....

....

....

....[3]

(c) Inorganic nutrients such as nitrates and phosphates are also passed along the food chain.

Suggest why overfishing of tuna and herring would reduce the quantity of nutrients available to the rest of the food chain.

....

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....

....

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....[3]

[Total: 15]

Section B

Answer **both** questions in this section.

Write your answers in the spaces provided.

3 **(a)** **(i)** Boats are built from a range of materials.

Name one of these materials **and** describe how its properties make it suitable for building boats.

material ....

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[3]

(ii) Describe the features of a typical fishing boat.

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....[6]

(b) Describe each of the following fishing methods **and** explain their environmental impacts.

(i) pole-and-line fishing

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....[3]

(ii) pelagic long-lining

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....[3]

[Total: 15]

4 (a) (i) State what is meant by the term *extensive aquaculture*.

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....[2]

(ii) Describe the possible environmental impacts of extensive aquaculture.

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....[5]

 [Turn over

(b) Aquaculture produces large quantities of fish that are processed and preserved to prevent spoilage.

Describe the processes involved in the spoilage of fish.

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....[8]

[Total: 15]