



# Cambridge International AS Level

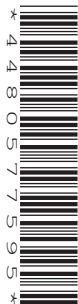
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## ENVIRONMENTAL MANAGEMENT

8291/23

Paper 2 Hydrosphere and Biosphere

October/November 2021

1 hour 30 minutes

You must answer **Section A** on the question paper and **Section B** on the answer booklet/paper you have been given.

You will need: Answer booklet/paper

### INSTRUCTIONS

- Section A: answer **all** questions. Write your answer to each question in the space provided on the question paper.
- Section B: answer **one** question. Write your answer on the separate answer booklet/paper provided.
- 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.
- 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.
- At the end of the examination, fasten all your work together. Do **not** use staples, paper clips or glue.

### INFORMATION

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

| For Examiner's use |  |
|--------------------|--|
| <b>Section A</b>   |  |
| 1                  |  |
| 2                  |  |
| <b>Section B</b>   |  |
| <b>Total</b>       |  |

This document has **12** pages.

## Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

- 1 (a) Table 1.1 shows the number of marine wildlife affected by marine debris in one year.

**Table 1.1**

| wildlife group | marine debris |      |                        |               |               |              |              |                 |       |
|----------------|---------------|------|------------------------|---------------|---------------|--------------|--------------|-----------------|-------|
|                | bottles       | cans | lobster and fish traps | fishing hooks | fishing lines | fishing nets | plastic bags | string and rope | other |
| amphibians     | 1             | 0    | 0                      | 0             | 3             | 1            | 6            | 0               | 1     |
| birds          | 2             | 0    | 0                      | 5             | 45            | 53           | 19           | 10              | 4     |
| fish           | 5             | 1    | 2                      | 1             | 48            | 11           | 11           | 7               | 3     |
| invertebrates  | 6             | 2    | 1                      | 1             | 14            | 12           | 6            | 13              | 0     |
| mammals        | 0             | 0    | 0                      | 3             | 6             | 1            | 6            | 6               | 1     |
| reptiles       | 0             | 0    | 0                      | 0             | 10            | 4            | 1            | 3               | 1     |

- (i) State which wildlife group is affected by every type of marine debris shown in Table 1.1.

..... [1]

- (ii) State which wildlife group is most affected by marine debris shown in Table 1.1.

..... [1]

- (iii) Suggest **two** sources of the marine debris shown in Table 1.1.

.....

..... [2]

- (iv) Calculate the percentage of all mammals in Table 1.1 affected by plastic bags.

..... % [1]

(b) Fig. 1.1 shows part of an ocean food web.

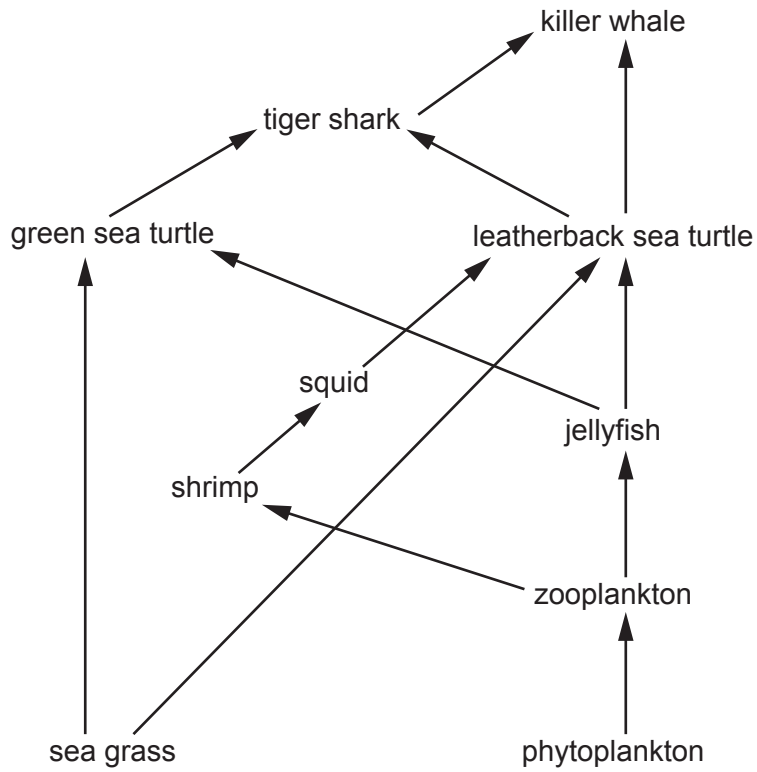


Fig. 1.1

(i) State what the arrows in the food web shown in Fig. 1.1 represent.

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

(ii) Sea turtles are under threat because of plastic bag pollution in the sea. The turtles mistake the bags for jellyfish.

Explain the effects of a reduction in sea turtle numbers on the food web shown in Fig. 1.1.

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 .....  
 ..... [4]

(iii) Suggest strategies to prevent plastic bag pollution reaching oceans.

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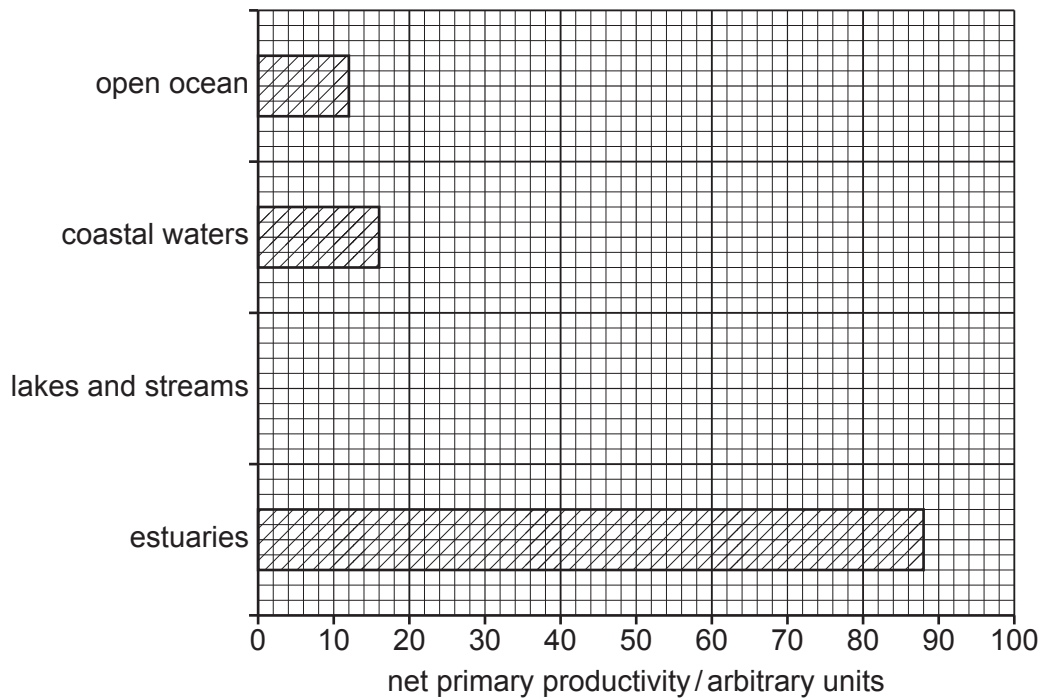
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..... [4]

(c) Fig. 1.2 shows the net primary productivity of different aquatic ecosystems.



**Fig. 1.2**

- (i) Complete the bar chart in Fig. 1.2 to show a net primary productivity of 23 arbitrary units for lakes and streams. [1]
- (ii) Suggest why net primary productivity is low in open oceans.

.....

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..... [2]

(iii) An estuary is found where a river meets coastal waters.

The net primary productivity of an estuary is high because there is a high concentration of nutrients.

Suggest reasons why the concentration of nutrients is high.

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..... [3]

[Total: 20]

2 Fig. 2.1 shows a habitat changing over time from open water to mixed woodland.

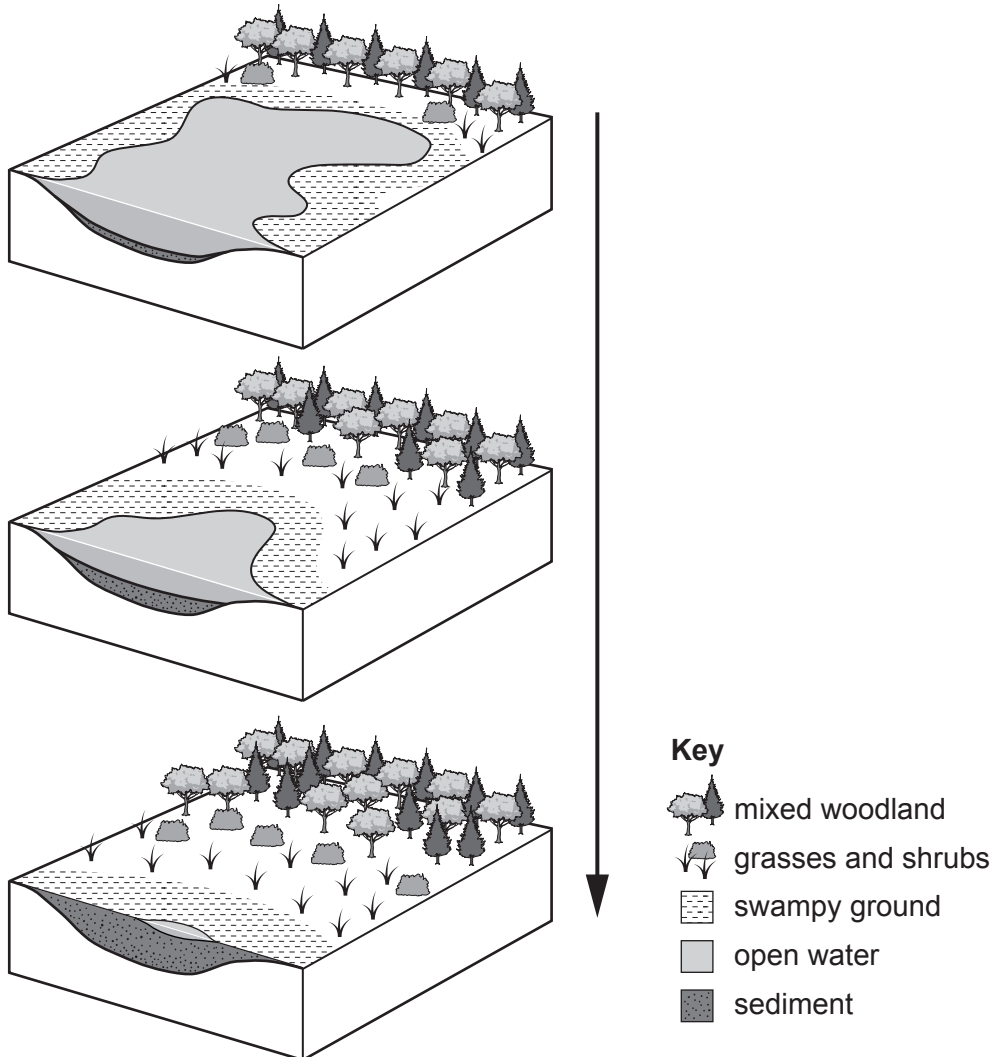


Fig. 2.1

(a) (i) State the process shown in Fig. 2.1.

..... [1]

(ii) Explain the reasons for the changes shown in Fig. 2.1.

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..... [6]

(iii) Explain what is meant by abiotic and biotic factors of an ecosystem.

Give an example for each.

abiotic .....  
.....  
.....

example .....

biotic .....  
.....  
.....

example ..... [4]

(b) Table 2.1 compares subsistence farming with commercial farming.

**Table 2.1**

| factor                 | subsistence farming                     | commercial farming                              |
|------------------------|---|---|
| amount of produce sold | low                                     | high  |
| destination of foods   | consumed on farm or locally             | high proportion processed by food manufacturers |
| power source           | animals                                 | fossil fuel, electricity                        |
| plant nutrition        | organic e.g. legumes, ash, bone, manure | chemical fertilisers                            |
| pest control           | crop rotation, intercropping            | commercial pesticides                           |
| weed control           | rotations, hoeing, hand picking         | commercial herbicide                            |
| seed                   | from own crops                          | from commercial grower                          |
| livestock feed         | from own crops, fodder                  | from commercial feed manufacturer               |

(i) Explain how commercial farming described in Table 2.1 can lead to loss of local habitats.

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..... [4]

(ii) Subsistence farmers often clear land for crops.

Explain why clearing land leads to loss of biodiversity.

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(iii) Describe a strategy to prevent land being cleared for crops.

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..... [2]

[Total: 20]

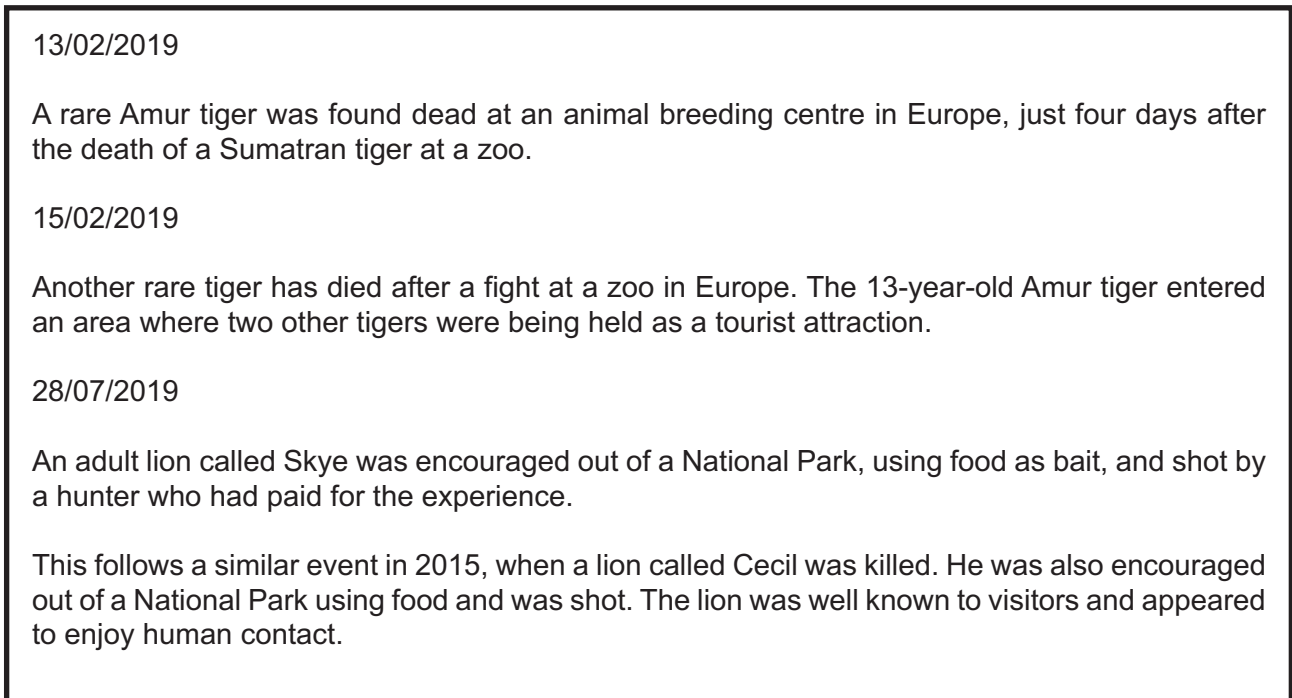
### Section B

Answer **one** question from this section.

Write your answers on the separate answer paper provided.

- 3 Animal breeding programmes and release into National Parks is one method of wildlife management.

Fig. 3.1 shows media reports about deaths of rare animals connected to this method of wildlife management.



**Fig. 3.1**

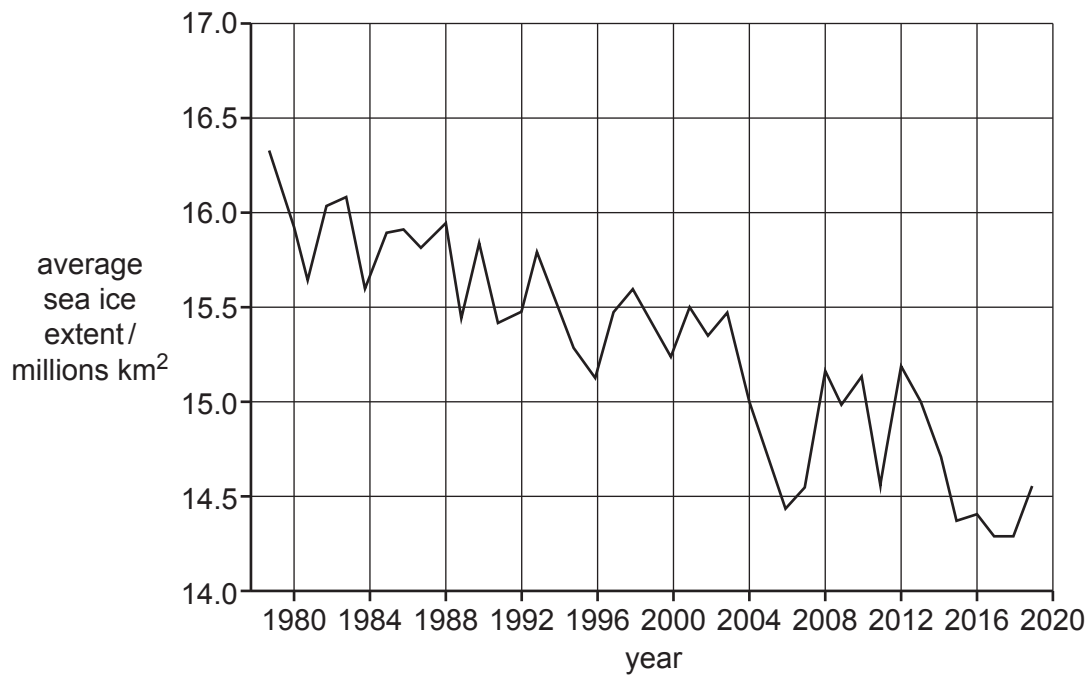
- (a) Animal breeding programmes and release into National Parks is one method of wildlife management.

With reference to Fig. 3.1 explain the advantages and disadvantages of this method of wildlife management. [10]

- (b) Using examples, evaluate the success of methods to conserve the biodiversity of ecosystems, other than animal breeding programmes and release into National Parks. [30]

[Total: 40]

4 Fig. 4.1 is a graph of average Arctic sea ice extent for March each year from 1979 – 2019.

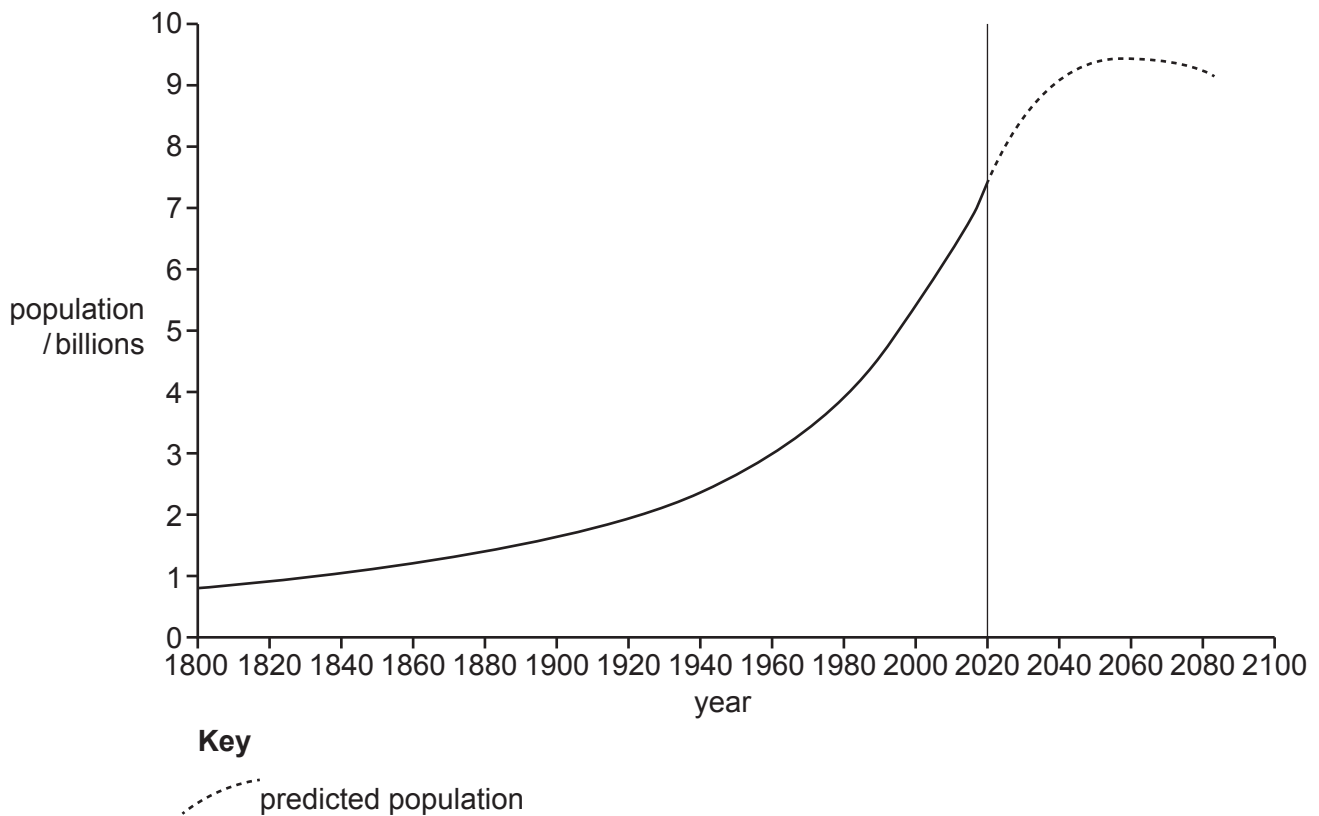


**Fig. 4.1**

- (a) Describe and explain the changes in Arctic sea ice extent shown in Fig. 4.1. [10]
- (b) Using examples, evaluate the success of different international protocols in managing environmental change. [30]

[Total: 40]

5 Fig. 5.1 is a graph showing human population from 1800 with a prediction to 2100.



**Fig. 5.1**

- (a) Describe and explain the trend shown in Fig. 5.1. [10]
- (b) Assess the difficulty of providing resources for the human population. Use examples from countries with contrasting levels of income. [30]

[Total: 40]

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