Cambridge Assessment International Education

Cambridge International AS Level

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

4052006819

ENVIRONMENTAL MANAGEMENT **8291/21**

Paper 2 Hydrosphere and Biosphere **October/November 2020**

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	
Section A	
1	
2	
Section B	
Total	

This document has **12** pages. Blank pages are indicated.

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 **(a)** Fig. 1.1 shows how the mass of plants changes during primary succession following a major environmental event.

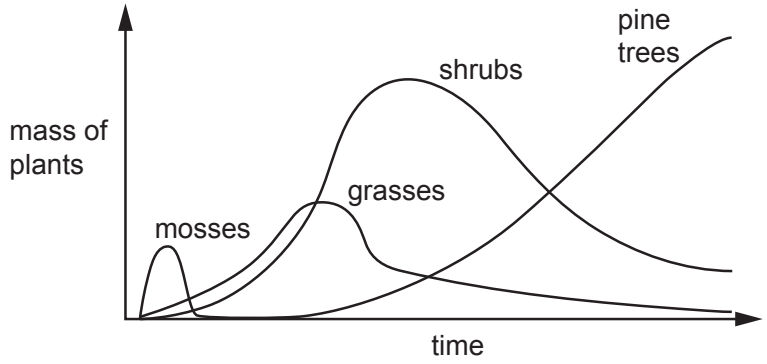

Fig. 1.1

(i) State **one** major environmental event which would lead to a primary succession.

..... [1]

(ii) Explain why there is a long period of time before the pine trees start to colonise, as shown in Fig. 1.1.

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..... [4]

(iii) Describe the difference between the origin of a primary succession and the origin of a secondary succession.

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..... [1]

(b) Fig. 1.2 shows stages in a sand dune succession.

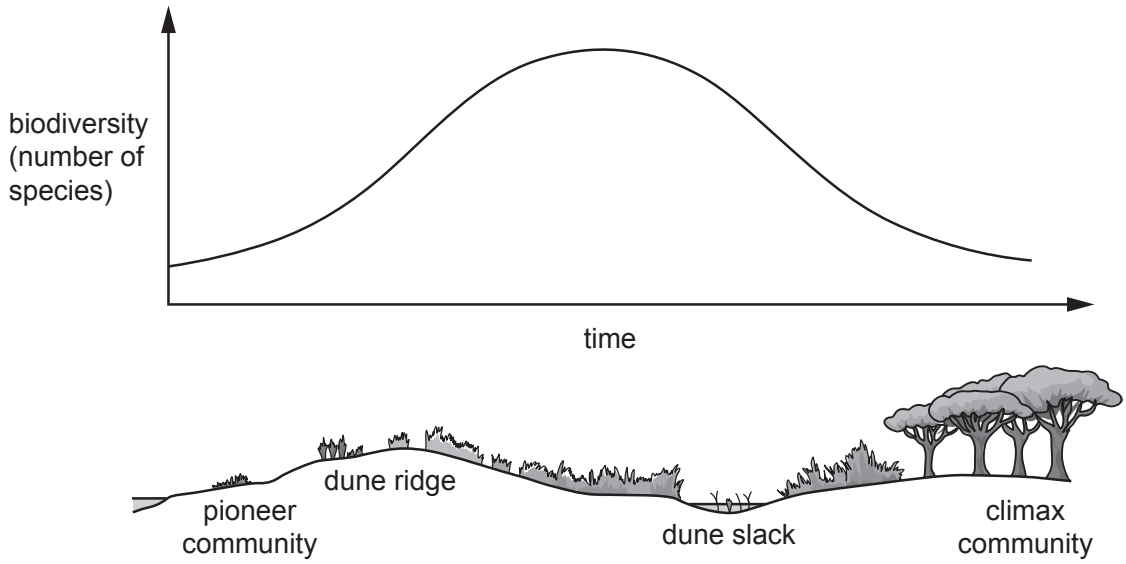

Fig. 1.2

(i) Explain why, after its maximum, biodiversity **decreases**, as shown in Fig. 1.2.

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..... [4]

(ii) Name **two** abiotic factors and describe how they differ at the pioneer stage and at the climax community stage shown in Fig. 1.2.

abiotic factor .....

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abiotic factor .....

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[4]

(iii) Explain why it is important to conserve and manage ecosystems such as the sand dune ecosystem.

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..... [4]

(c) Suggest how arrested succession can occur in an ecosystem.

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..... [2]

[Total: 20]

2 **(a)** Fig. 2.1 is an extract from a scientific report published on the internet.

A group of pollutants, polychlorinated biphenyls (PCBs), are present at 'dangerously high levels' in Europe's killer whales and dolphins, scientists say.

PCBs were once used in electrical equipment, paints and flame-retardants, but were banned from the 1970s because of their toxic effect in humans and animals.

PCBs are found in landfill sites awaiting safe disposal. However, PCBs have persisted in the environment, and are now accumulating in the blubber (fatty tissue) of top predators such as killer whales and dolphins.

The contamination is so high that some populations of killer whales are facing extinction.

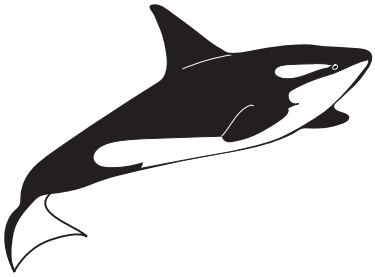

Fig. 2.1

(i) Suggest how pollutant PCBs have moved from landfill sites to the sea.

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..... [2]

(ii) Explain how pollutant PCBs are accumulating in top predators such as the killer whale and dolphins.

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..... [4]

(iii) Suggest **two** ways the problem of pollutant PCBs could be reduced.

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..... [2]

(b) Fig. 2.2 shows the percentage composition of marine litter by its major types.

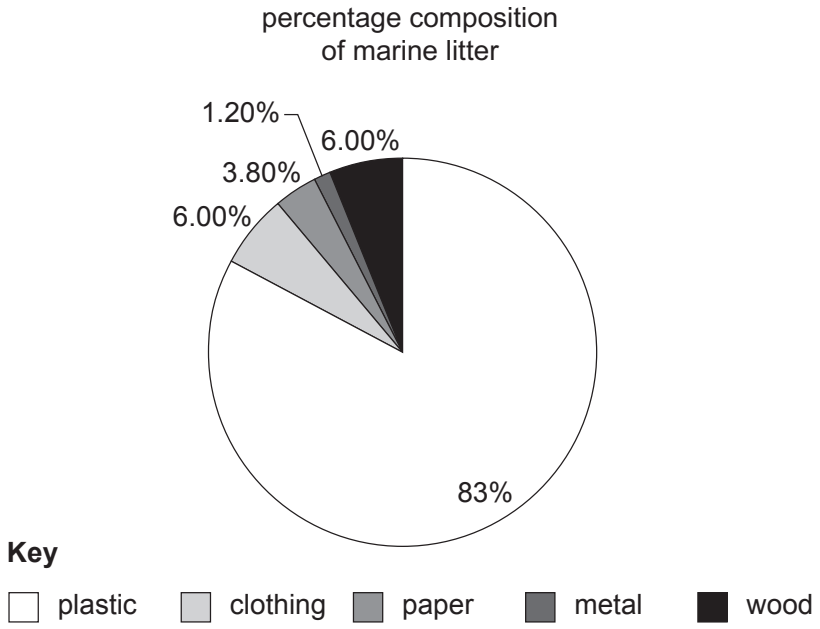

Fig. 2.2

(i) Suggest **two** sources of the major types of marine litter shown in Fig. 2.2.

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..... [2]

(ii) Describe **three** environmental problems caused by the major types of marine litter shown in Fig. 2.2.

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..... [6]

(iii) Describe **two** strategies to prevent the increase in marine litter.

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..... [4]

[Total: 20]

Section B

Answer **one** question from this section.

Write your answers on the separate answer paper provided.

3 Fig. 3.1 is a map showing the location of the Belo Monte dam, a hydroelectric power (HEP) project in the rainforest in the state of Para, Brazil.

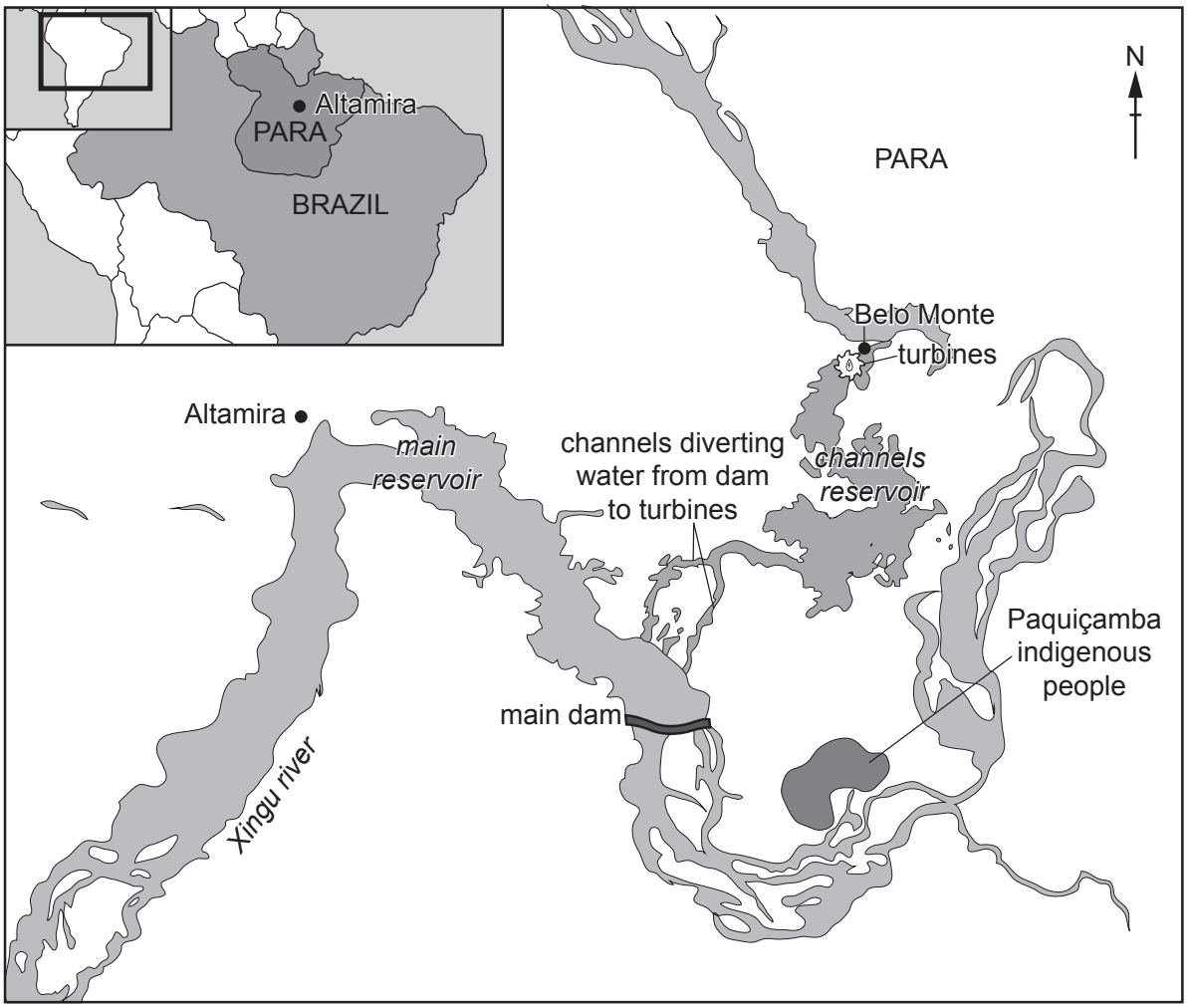

Fig. 3.1

(a) Describe the advantages and disadvantages of constructing HEP projects such as that shown in Fig. 3.1. [10]

(b) Reservoirs can be used to supply drinking (potable) water.

Evaluate the success of other strategies for maintaining a sustainable supply of drinking (potable) water in countries with contrasting levels of economic development. [30]

[Total: 40]

4 Fig. 4.1 is a model of a biosphere conservation area.

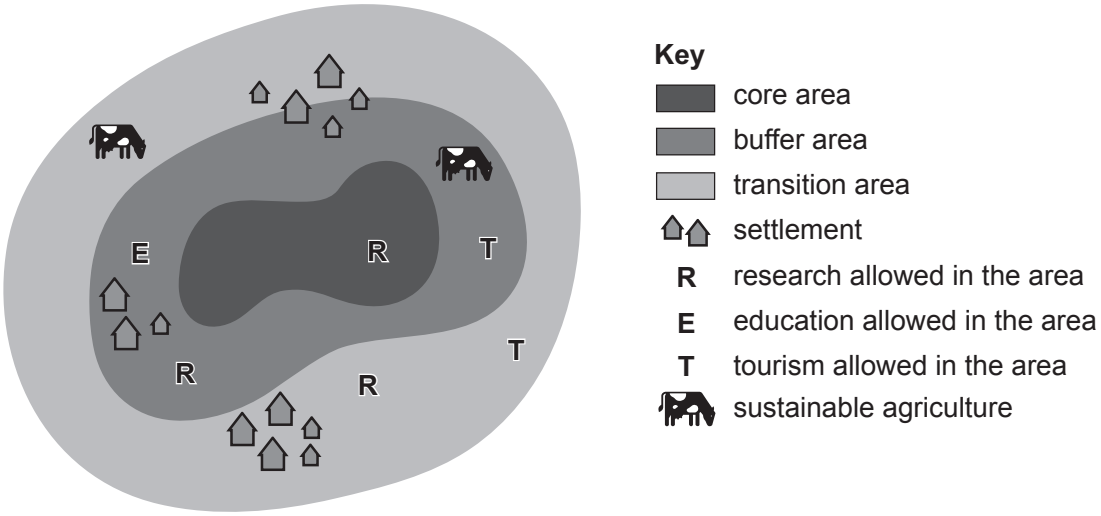

Fig. 4.1

(a) Explain the purpose and layout of the biosphere conservation area shown in Fig. 4.1. [10]

(b) Assess the extent to which the success of conservation methods can be affected by political and economic factors. [30]

[Total: 40]

5 Fig. 5.1 shows sources of pollution in two rivers.

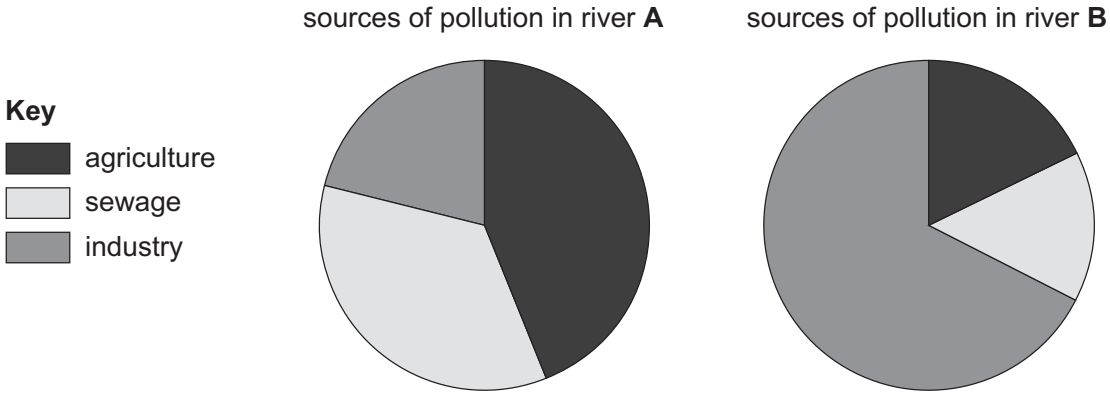

Fig. 5.1

(a) Describe the differences in the data for river **A** and river **B**. Suggest reasons for the differences shown in Fig. 5.1. [10]

(b) Discuss the impact of raw sewage disposal on rivers, lakes and human health.

Use examples in your answer. [30]

[Total: 40]

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