Cambridge International AS Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

ENVIRONMENTAL MANAGEMENT **8291/11**

Paper 1 Lithosphere and Atmosphere **May/June 2019**

1 hour 30 minutes

Additional Materials: Answer Booklet/Paper

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.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

Section A
Answer **all** questions in this section.
Write your answers in the spaces provided on the question paper.

Section B
Answer **one** question from this section.
Write your answers on the separate answer paper provided.

At the end of the examination,
1. fasten all separate answer paper securely to the question paper;
2. enter the question number from Section B in the grid.

	For Examiner's Use
Section A	
1	
2	
Section B	
Total	

This document consists of **13** printed pages and **3** blank pages.

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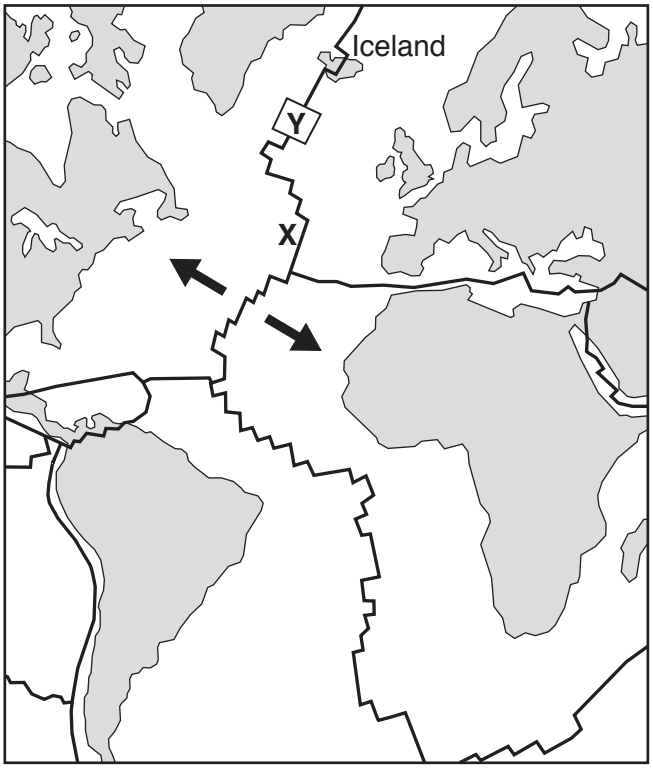
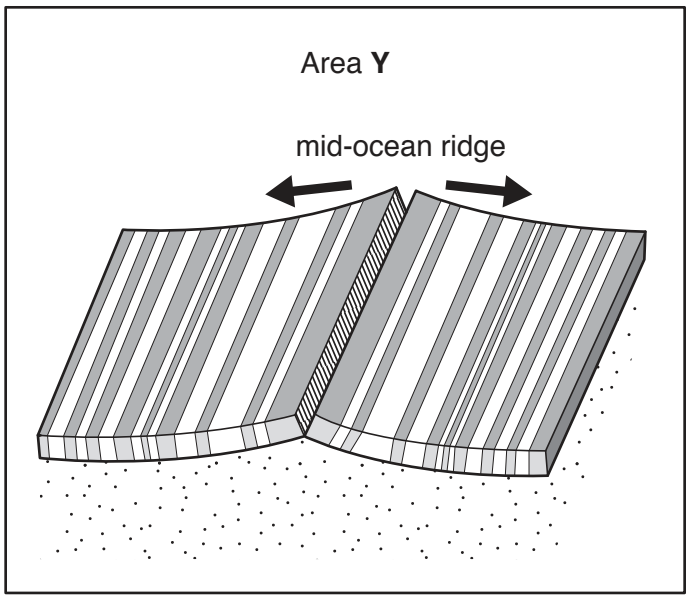
Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 **(a)** Fig. 1.1 is a map showing the plate boundaries in the Atlantic Ocean and an enlarged diagram of area **Y**.





Key

- direction of plate movement
- plate boundary

Key

- areas of normal magnetic polarity in the crust
- areas of reversed magnetic polarity in the crust
- mantle
- direction of plate movement

Fig. 1.1

(i) Name the type of plate boundary labelled **X** in Fig. 1.1.

..... [1]

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(ii) Describe the processes which occur that cause ocean floor spreading.

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..... [3]

(iii) Explain how the pattern of magnetic reversals shown in Fig. 1.1 provides evidence for ocean floor spreading.

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(b) Fig. 1.2 shows a simplified cross-section through a mid-ocean ridge and includes the oceanic plates.

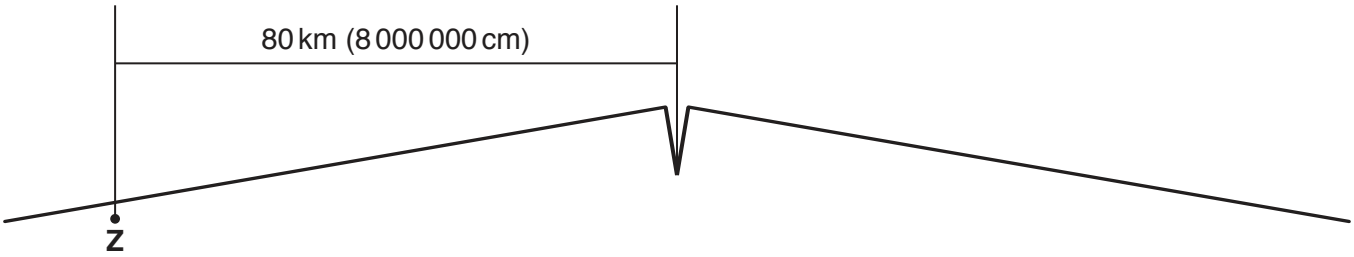

Fig. 1.2

(i) Scientists measured the age of the rock at point **Z** and found it to be 3 000 000 years old.

Use the data provided in Fig. 1.2 to calculate the rate at which this plate is moving. Give your answer in cm per year.

..... cm per year [2]

(ii) Fig. 1.1 shows the location of Iceland, an island in the North Atlantic.

Outline **four** strategies that could be used to protect the people who live in Iceland from volcanic hazards.

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..... [4]

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The theory of plate tectonics has developed over time and is based on a range of evidence.

Fig. 1.3 is a map showing evidence to support the idea that some continents were once connected as part of the supercontinent of Pangaea.

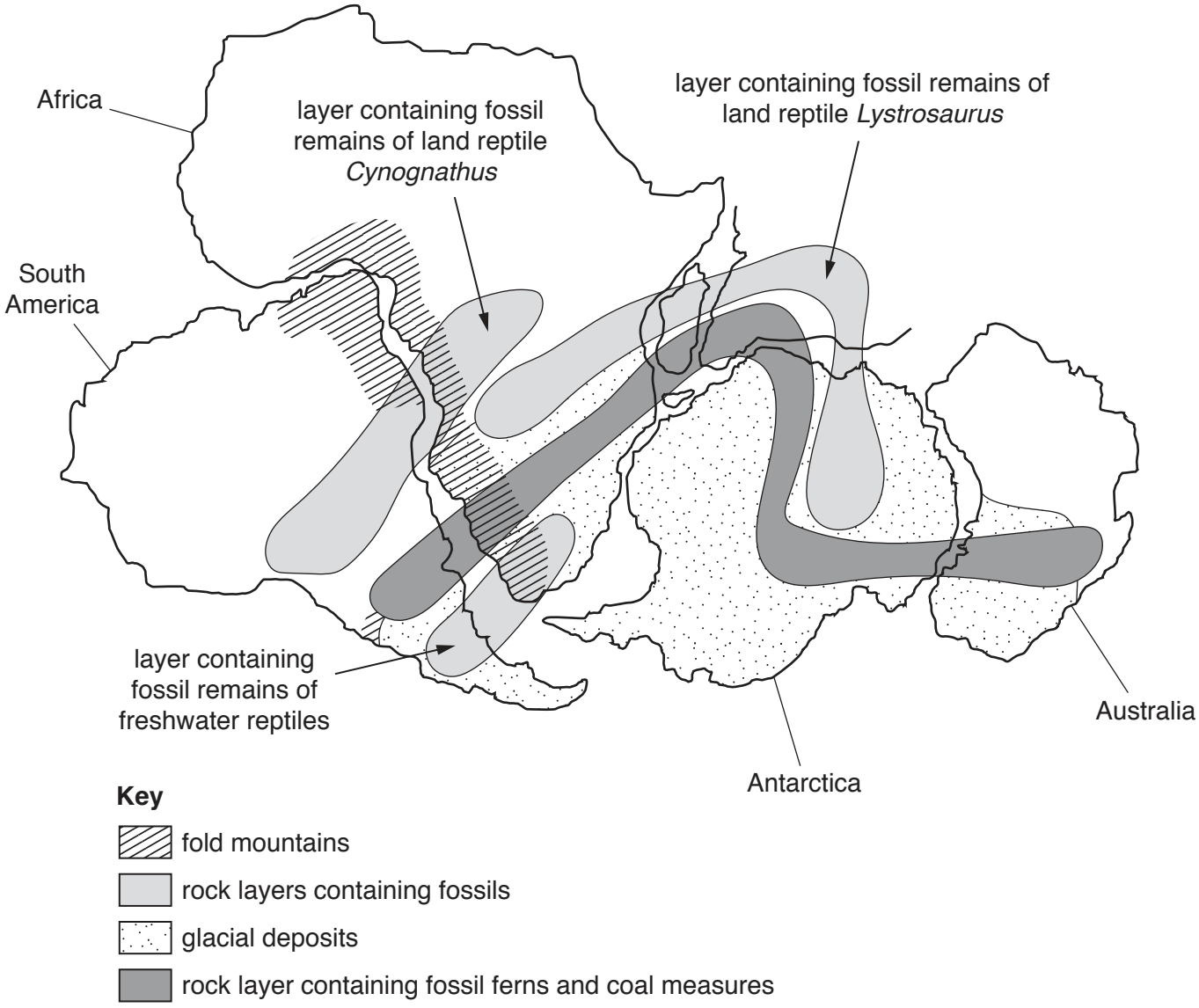

Fig. 1.3

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(c) Select **two** pieces of evidence from Fig. 1.3 and explain how each supports the theory that the continents have moved apart over time.

piece of evidence 1 .....

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explanation .....

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piece of evidence 2 .....

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explanation .....

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..... [6]

[Total: 20]

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2 **(a)** Fig. 2.1 is a graph showing predicted global sea-level rises from 2007.

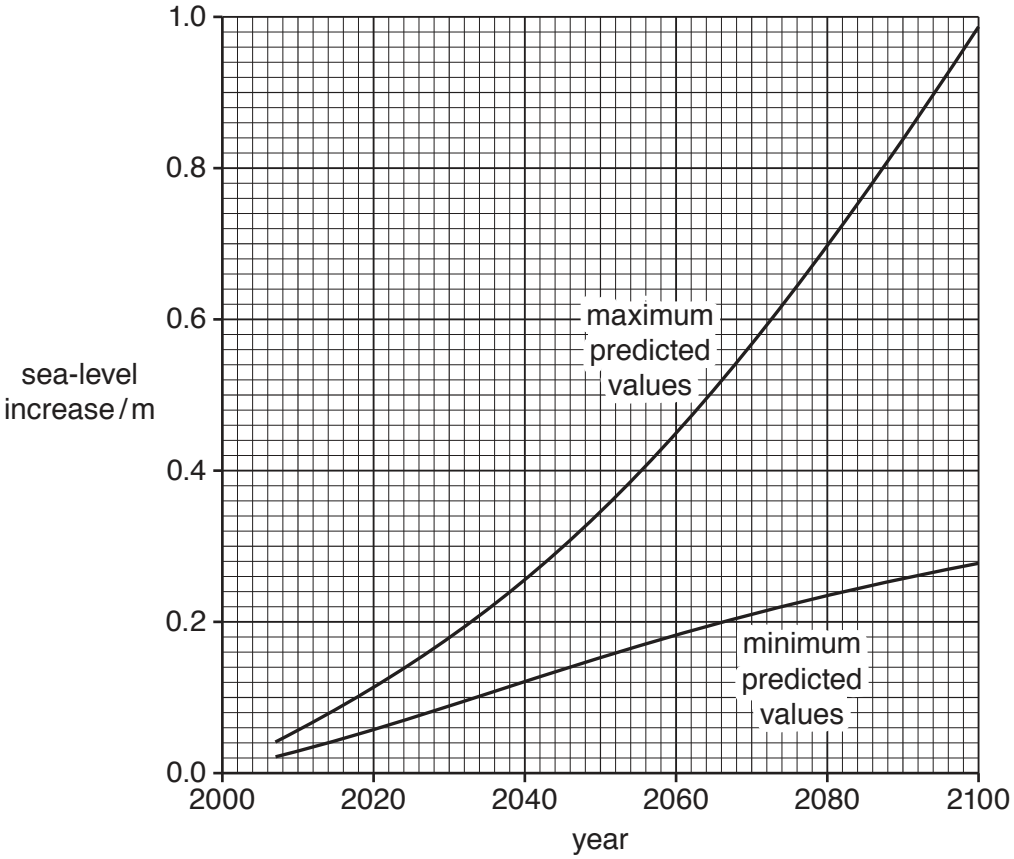

Fig. 2.1

(i) Use Fig. 2.1 to calculate the largest predicted increase in sea level from 2020 to 2060.

..... m [2]

(ii) Use Fig. 2.1 to calculate the range between the maximum predicted value and minimum predicted value for the year 2080.

..... m [2]

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Fig. 2.2 is a sketch map of a section of coastline.

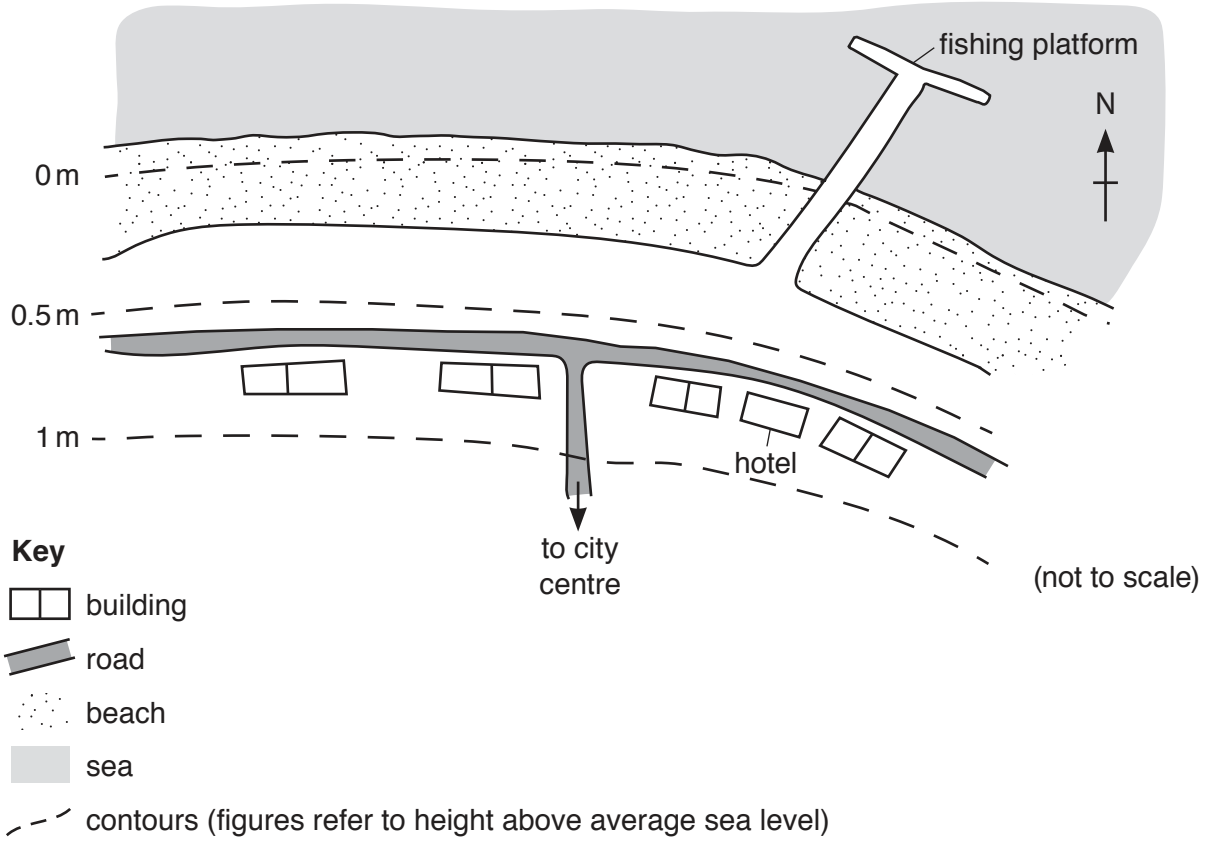

Fig. 2.2

(iii) Suggest the impacts of a 0.5 m sea-level rise on the coastal region shown in Fig. 2.2.

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(iv) Outline how emissions from human activity can cause an enhanced greenhouse effect, leading to a global sea-level rise.

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(v) Describe what is meant by the term *afforestation* and explain how afforestation could reduce the effect of emissions that contribute to the enhanced greenhouse effect.

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(vi) Suggest reasons why it is difficult to monitor the atmospheric changes caused by human activity.

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[Total: 20]

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Section B

Answer **one** question from this section.

3 Nepal is a country in a mountainous region.

Fig. 3.1 shows average precipitation levels and the number of landslides in Nepal from 1990 to 2010.

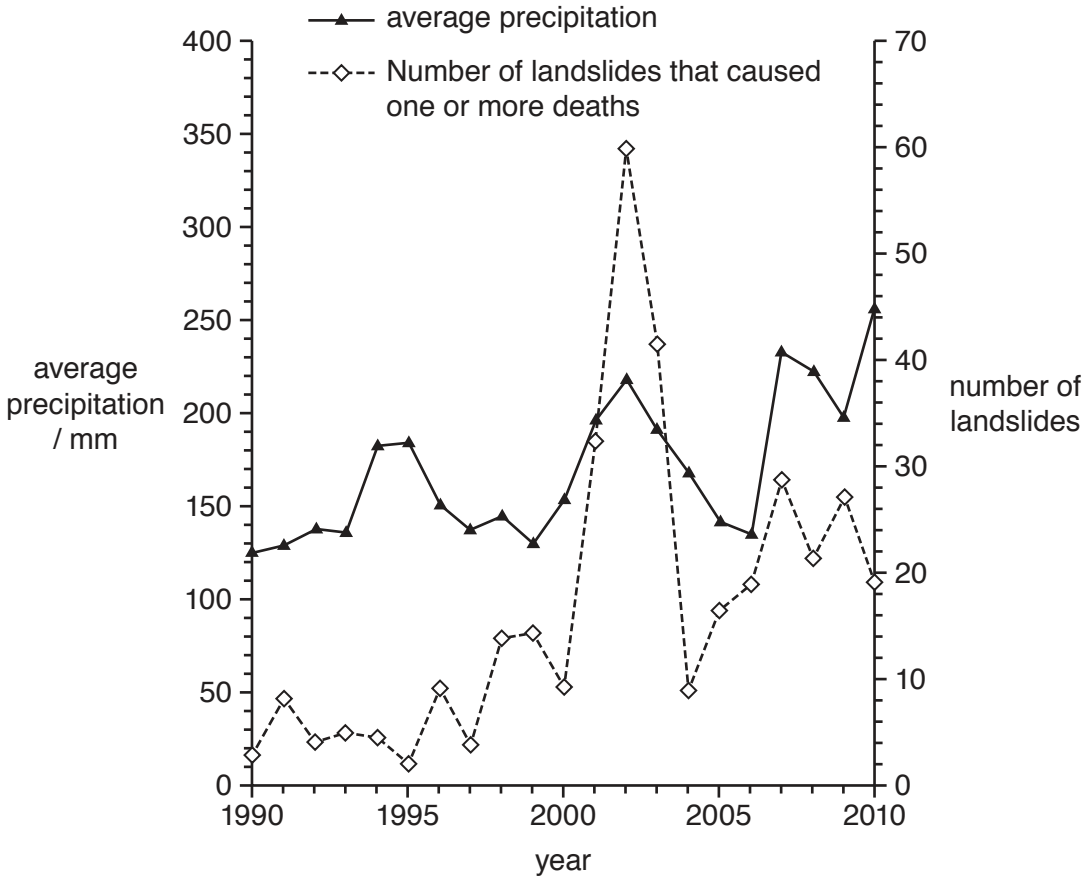

Fig. 3.1

(a) Using Fig. 3.1, describe and explain the relationship between average precipitation and the frequency of landslides from 1990 to 2010. [10]

(b) Using examples, assess the success of slope management strategies in countries with contrasting levels of economic development. [30]

[Total: 40]

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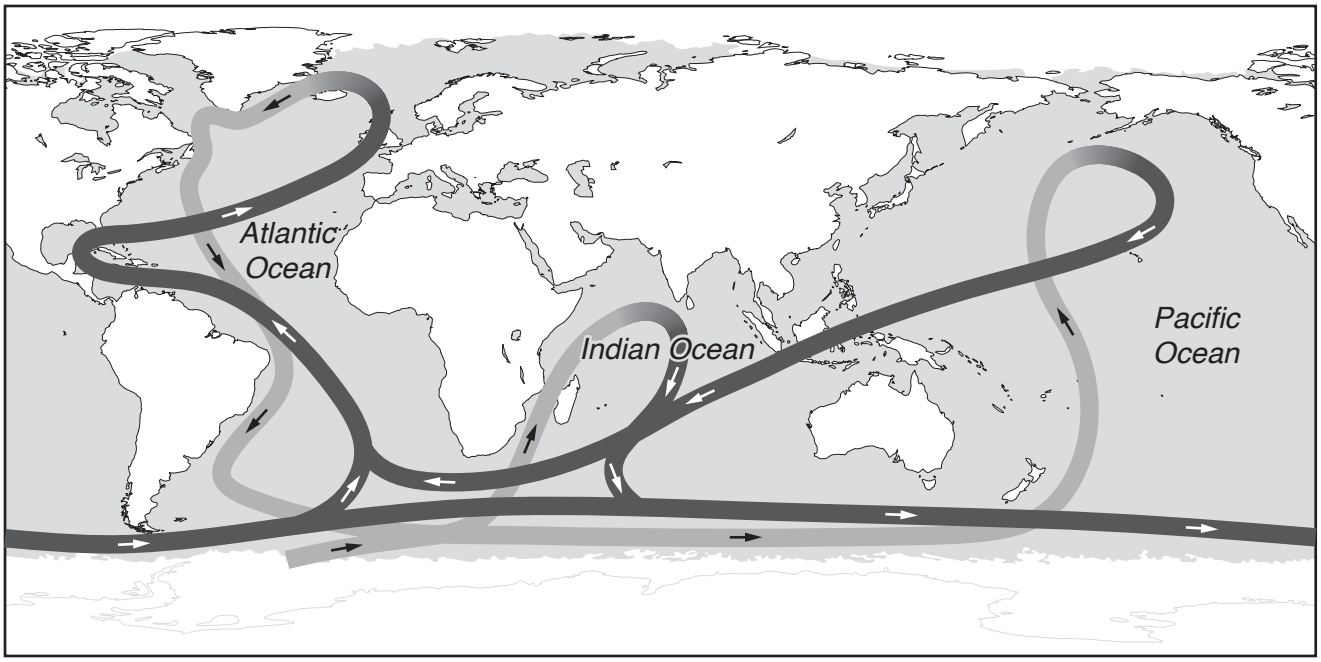
4 Fig. 4.1 shows a constantly moving system of deep ocean currents.



Key

cold ocean current

warm ocean current

Fig. 4.1

(a) Describe the pattern of ocean currents shown in Fig. 4.1 and explain how ocean currents influence global climate. [10]

(b) A reduction in the extent of polar ice has been linked to the combustion of fossil fuels. Using examples, assess the extent to which the use of renewable energy can successfully reduce dependence on fossil fuels. [30]

[Total: 40]

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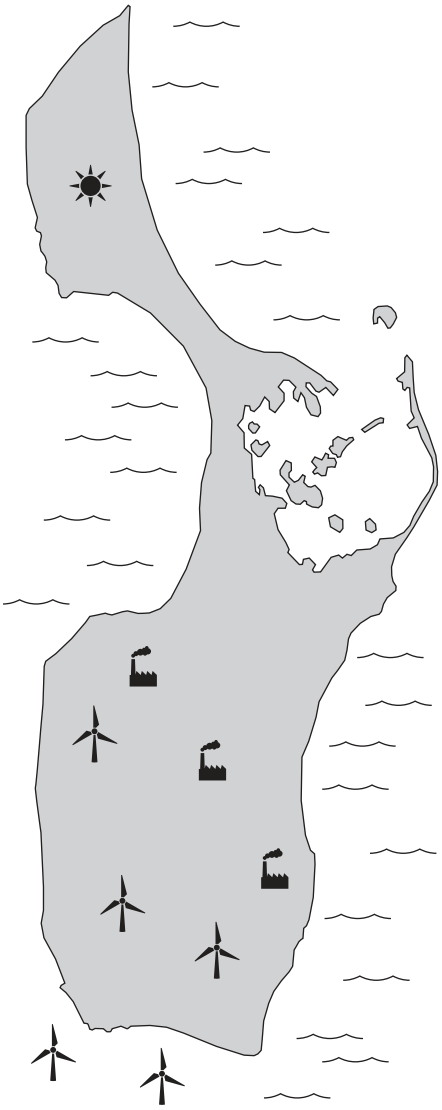
5 Fig. 5.1 is a diagram of the coastal island of Samso, Denmark and information about the renewable energy projects on the island.

The island relies entirely on renewable energy sources.



Renewable Energy Projects

Wind – There are 11 onshore and 10 offshore wind turbines.

Solar – There is a 880 m^2 solar panel field which preheats water before it is transported to the straw-fired power station.

Power station – There are 3 power stations that are fuelled by wheat and rye straw which produce heat and electricity.

Population

In 2017, the total population was 3724.

Agriculture

During milk production heat exchangers harness the heat from fresh milk when it is cooled.

Tractors are adapted to use biofuel (ethanol).

Transport

All cars are electric cars.

There is a network of cycle paths.

Fig. 5.1

(a) With reference to Fig. 5.1, describe and explain the challenges of relying entirely on renewable energy sources. [10]

(b) With reference to examples from countries at different stages of economic development, discuss the factors that governments must consider when planning a country's energy policy. [30]

[Total: 40]

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