Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

8499389917

ENVIRONMENTAL MANAGEMENT **0680/23**

Paper 2 Management in context **May/June 2019**

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

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.

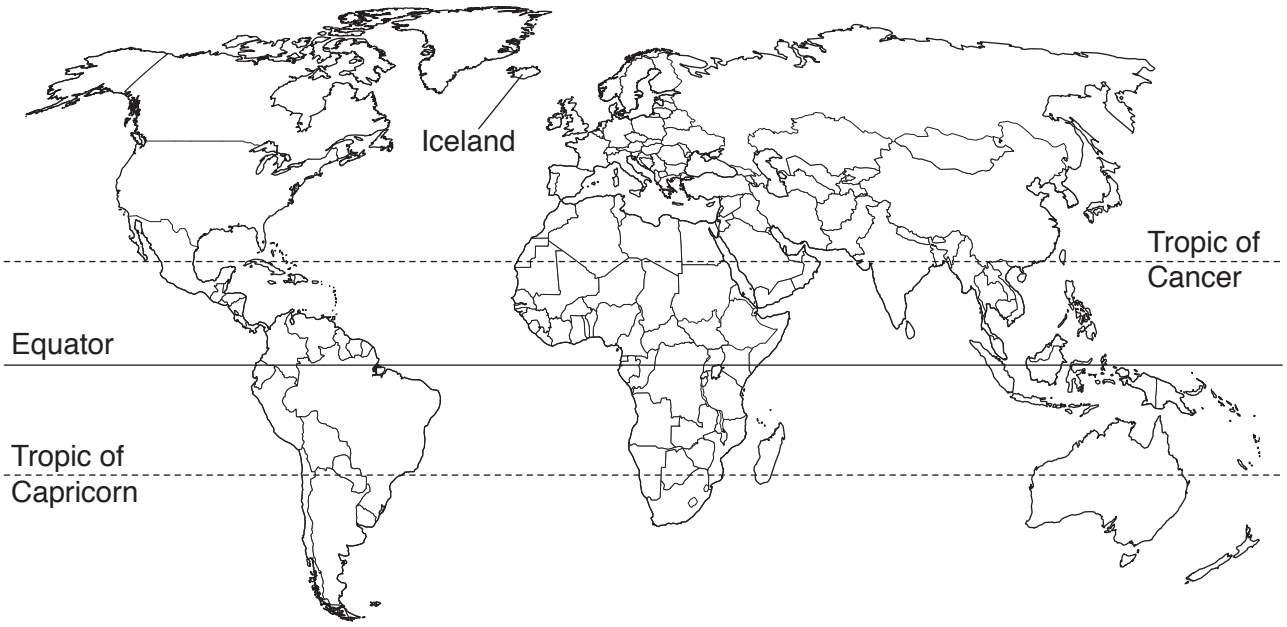
This document consists of **22** printed pages and **2** blank pages.

© UCLES 2019

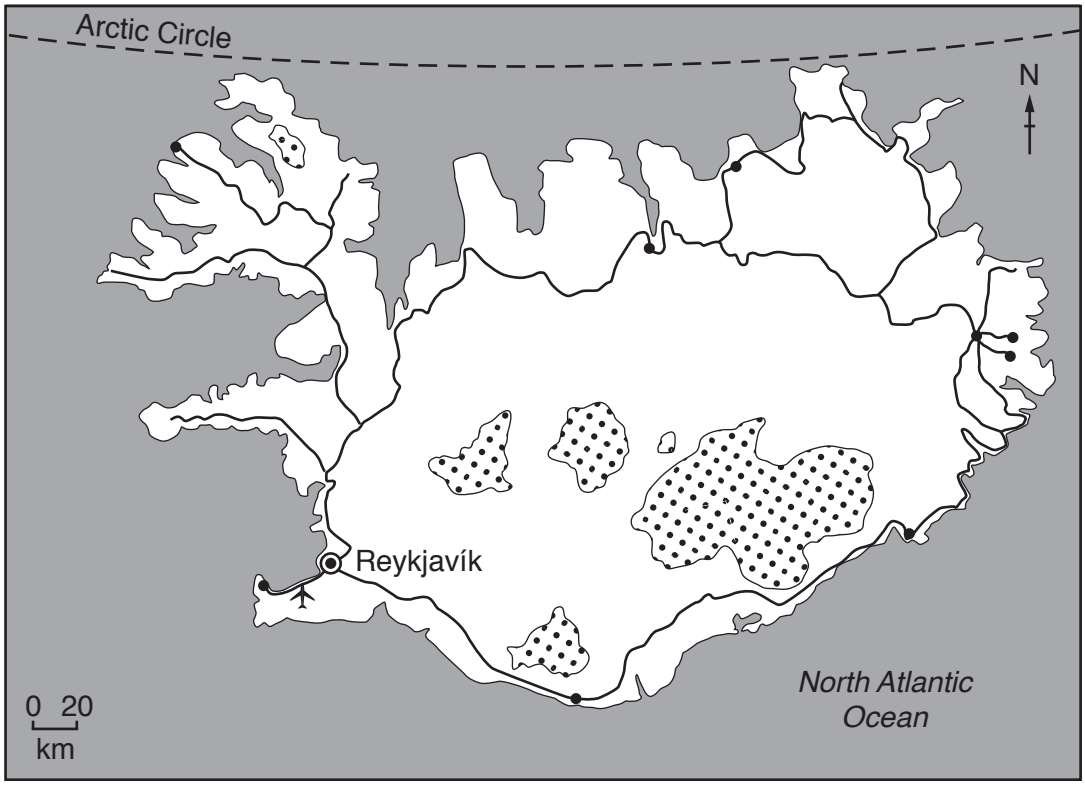
Cambridge Assessment International Education

[Turn over

world map showing the location of Iceland



map of Iceland



Key

- capital city
- town
- road
- airport
- glacier

© UCLES 2019

Area of Iceland: 103 000 km^2

Population: 335 878 (in 2017)

Children per woman: 2.01

Life expectancy: 83 years

Currency: Icelandic Krona (108.45 ISK = 1 USD)

Language: Icelandic

Climate of Iceland: temperate, moderated by North Atlantic current, cold, windy winters; damp, cool summers

Terrain of Iceland: mostly volcanic plateau with some mountain peaks, volcanoes, glaciers, coastal bays

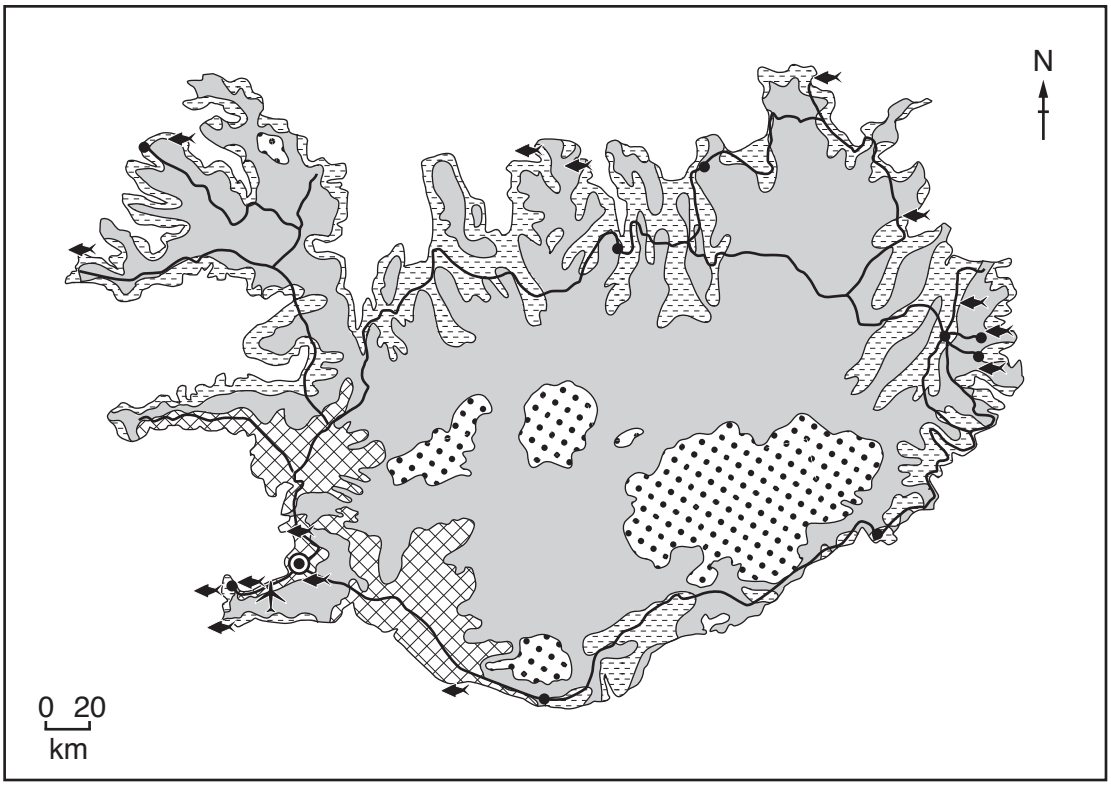
Main exports of Iceland: fish and fish products, aluminium and ferrosilicon

Iceland is an island in the North Atlantic Ocean. 80% of the island is uninhabited. Half of the population are located in the capital city, with smaller towns along the coast. The economy depends heavily on fishing. Since 2010, tourism has become the main economic growth area for the island, with the number of tourists each year reaching 4.5 times the Icelandic population. The island makes use of geothermal and hydro-electric power, which are available in large quantities.

© UCLES 2019

[Turn over

1 **(a)** The map shows how some of the land in Iceland is used.



Key

land use

- arable agriculture
- pastoral agriculture
- permanent ice and snow
- unused land
- fishing port and processing centre
- capital city
- town
- road
- airport

(i) Use the map to suggest reasons why the capital city of Iceland is located on the coast and not in the central region of the island.

.....

.....

.....

.....

.....

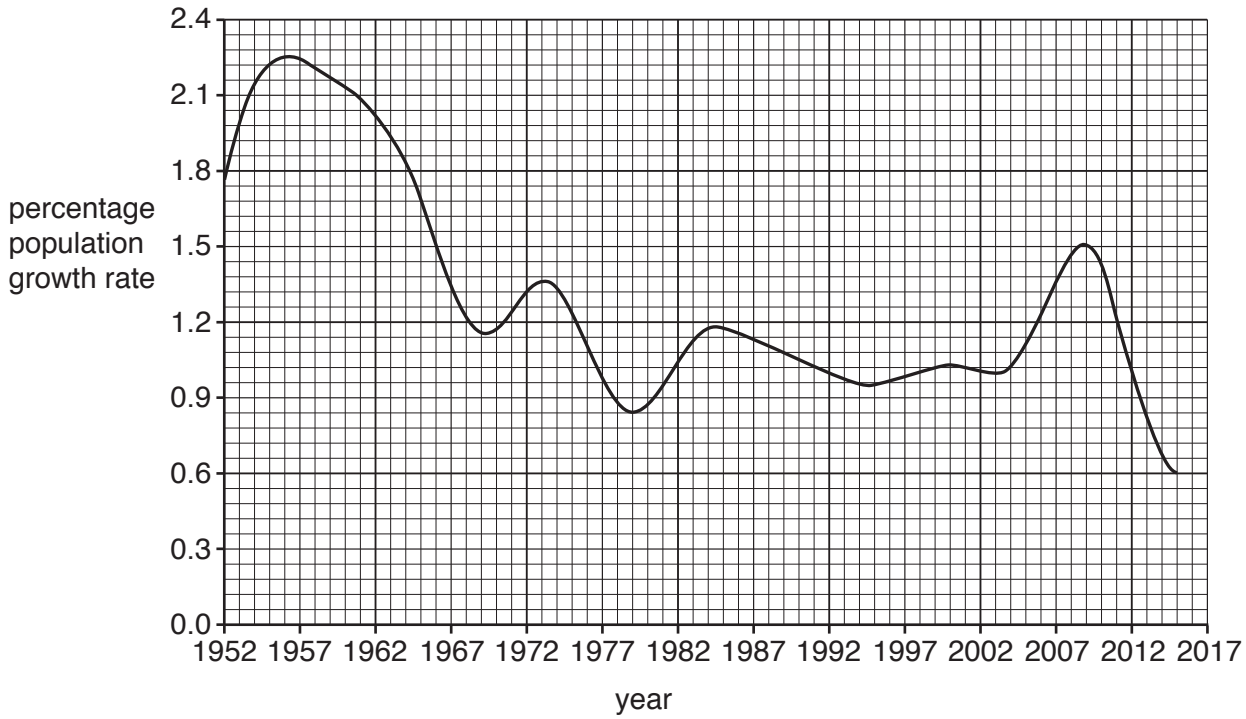
..... [3]

© UCLES 2019

(ii) Estimate the number of people who do **not** live in the capital city of Iceland.

..... [1]

(b) The graph shows the percentage population growth rate for Iceland between 1952 and 2015.



Describe the trends in the percentage population growth rate for Iceland between 1952 and 2015.

.....

.....

.....

.....

.....

..... [3]

(c) The table shows climate data for a weather station near the capital city of Iceland.

month	minimum average monthly temperature / °C	maximum average monthly temperature / °C	average monthly precipitation / mm
January	–3.0	1.9	75.6
February	–2.1	2.8	71.8
March	–2.0	3.2	81.8
April	0.4	5.7	58.3
May	3.6	9.4	43.3
June	6.7	11.7	50.0
July	8.3	13.3	51.8
August	7.9	13.0	61.8
September	5.0	10.1	66.5
October	2.2	6.8	85.6
November	–1.3	3.4	72.5
December	–2.8	2.2	78.7

(i) Identify the month with the highest average monthly temperature.

..... [1]

(ii) The range for the monthly temperature is the difference between the maximum and minimum value.

Calculate the temperature range for December.

..... °C [1]

(iii) There is limited pastoral agriculture in Iceland.

Suggest the problems the climate of Iceland causes for pastoral farmers.

.....

.....

.....

.....

.....

..... [3]

© UCLES 2019

(d) Bananas grow in hot climates. In Iceland, bananas are grown in greenhouses.

The soil is heated in the greenhouses and artificial lighting provides light all year.

Carbon dioxide is pumped into the greenhouses.

(i) Explain how the conditions in these greenhouses allow the growth of bananas.

.....

.....

.....

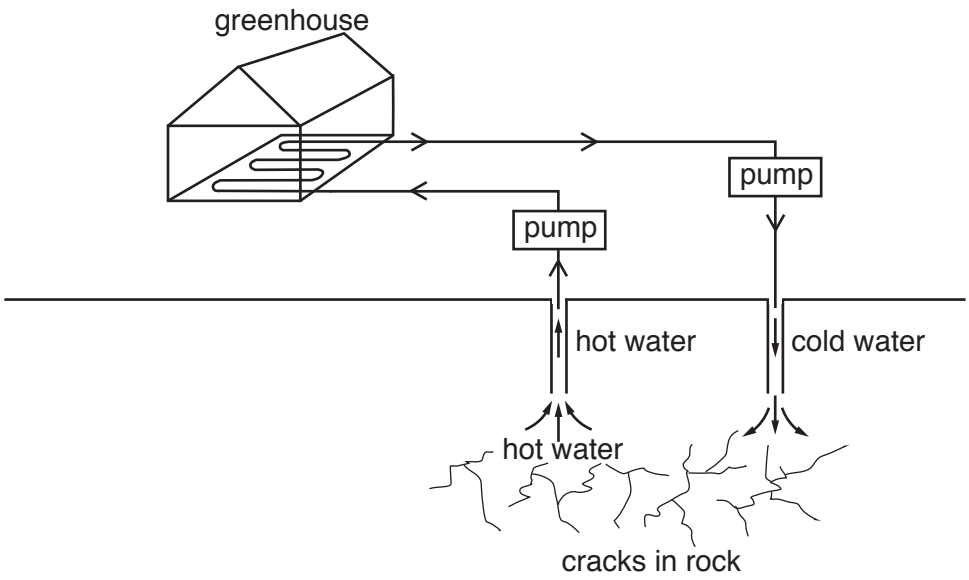
.....

.....

..... [3]

(ii) The greenhouses are heated using geothermal power.

The diagram shows how geothermally heated ground water is used to heat a greenhouse.



Use the diagram to describe how geothermally heated ground water is used to heat a greenhouse.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(iii) Geothermal power is a renewable resource and nuclear power is a non-renewable resource.

Name **one** other non-renewable energy resource.

..... [1]

(iv) Suggest reasons why some people do **not** want to live near nuclear power stations.

.....

.....

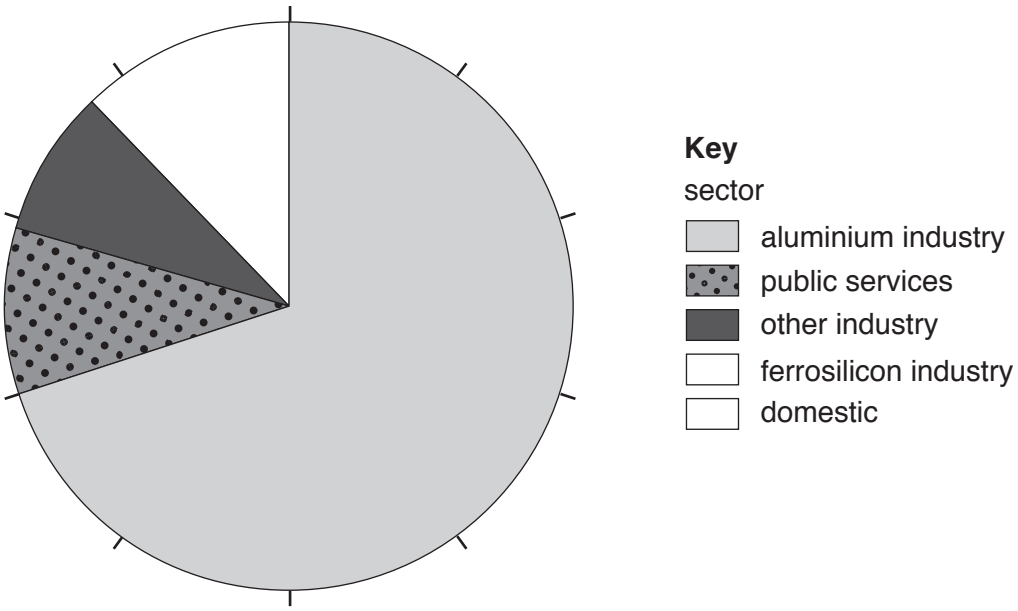
.....

.....

.....

..... [3]

(e) The pie chart shows the percentage electricity consumption for different sectors in Iceland for 2013.



(i) Use the table to complete the pie chart and the key.

sector	percentage electricity consumption
ferrosilicon industry	9.0
domestic	3.0

[2]

(ii) Suggest why electricity consumption **cannot** be used as a measure of economic importance for an industry.

.....

..... [1]

(iii) Describe **three** ways domestic electricity consumption could be reduced.

1 .....

.....

2 .....

.....

3 .....

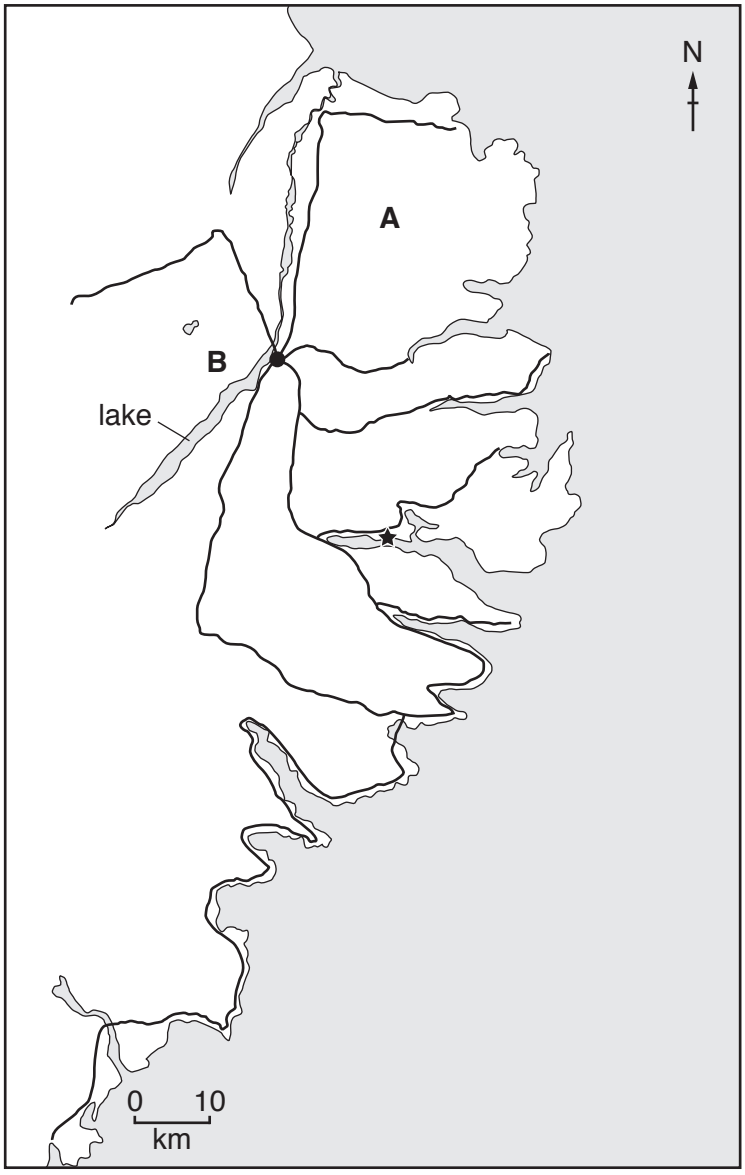
.....

[3]

© UCLES 2019

(f) A company wants to expand the aluminium industry in Iceland by building a new aluminium smelter. The smelter requires a large supply of fresh water and electricity.

The map shows two proposed locations for the smelter, **A** and **B**, near the east coast of Iceland.



Key

road

A and **B** proposed location of smelter

town

port

(i) The company decide that location **B** is a better choice than **A**.

Suggest why.

.....

.....

.....

..... [2]

(ii) The company decided to use a questionnaire to find out people's views on expanding the aluminium industry.

Part of the questionnaire is shown.

	response
1. In what ways do you think expanding the aluminium industry will or will not create more job opportunities for local people?	
2. List the ways the new smelter will or will not improve transport links in the local area.	

Suggest reasons why the responses to these questions are unlikely to provide useful data.

.....

.....

.....

..... [2]

(iii) State a type of sampling method that could be used to select people for this questionnaire.

..... [1]

(iv) Bauxite, the ore from which aluminium is obtained, is imported into Iceland. Bauxite is extracted by surface mining.

Describe how this type of mining causes more land to be damaged compared with subsurface mining.

.....

.....

.....

.....

.....

..... [3]

(v) State **one** way metals such as aluminium can be used more sustainably.

..... [1]

© UCLES 2019

(g) Fluorides are gaseous chemicals produced during the smelting of aluminium.

A cattle farmer living near an aluminium smelter is concerned about the level of fluorides in the crops that the cattle eat.

The farmer tests samples of the crops at increasing distances from the aluminium smelter.

crop sample	level of fluorides in the crop sample / mg per kg
A	19
B	7
C	13
D	32

(i) Predict the order in which the samples were collected.
One has been completed for you.

closest to smelter → furthest from smelter

D	.....	.....	.....

[1]

(ii) The safe level of fluorides in crops for cattle is 30 mg / kg.

Is it safe for the farmer to let the cattle eat the crops? Give reasons for your answer.

.....

.....

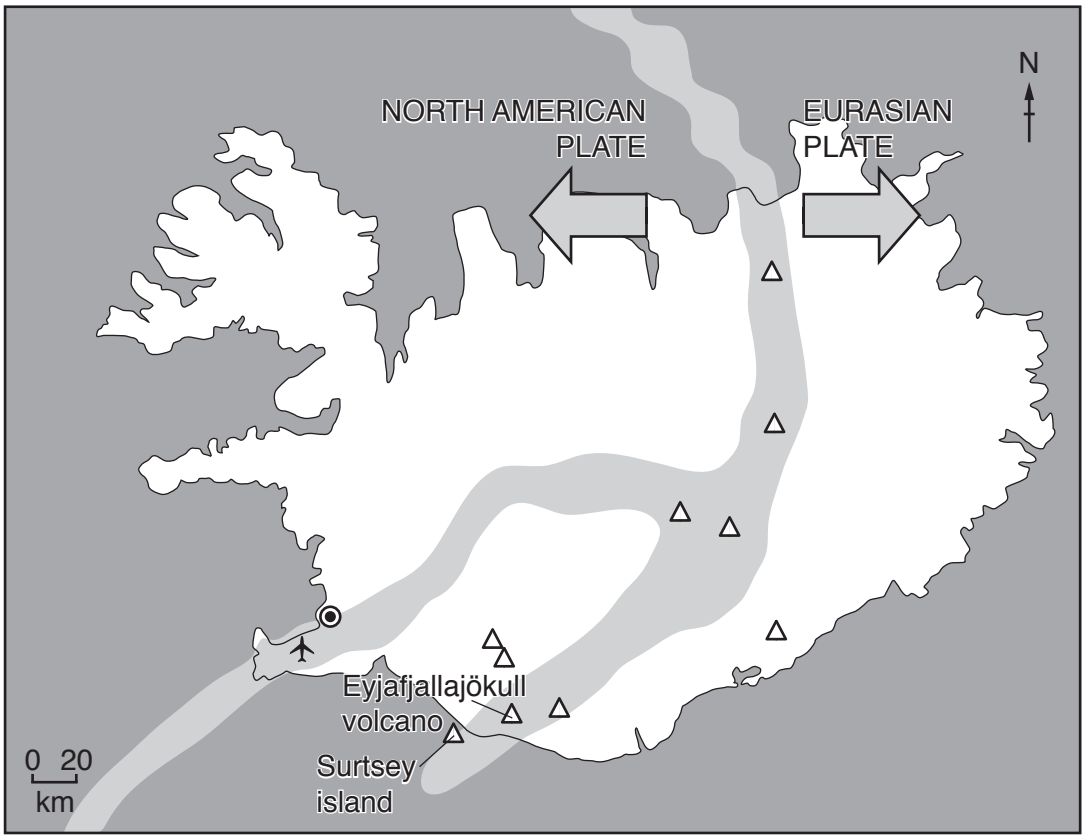
.....

..... [2]

[Total: 41]

2 **(a)** Iceland is situated on the Mid-Atlantic Ridge plate boundary. The two plates, the North American plate and the Eurasian plate, are slowly moving apart. This means Iceland becomes bigger every year.

The map shows the plates, the Mid-Atlantic Ridge and the location of Iceland's major volcanoes.



Key

- capital city
- airport
- major volcano
- Mid-Atlantic Ridge

(i) Explain why the youngest rocks are found in the central region of Iceland, along the Mid-Atlantic Ridge.

.....

.....

.....

..... [2]

(ii) Use the map to predict the distribution of earthquakes in Iceland.

.....

..... [1]

(b) Surtsey island formed in 1963 as a result of an underwater volcanic eruption.

Scientists are using Surtsey island to study how plant and animal species spread to new areas, without any human involvement.

Suggest ways Surtsey island could be protected from the impact of humans.

.....

.....

.....

.....

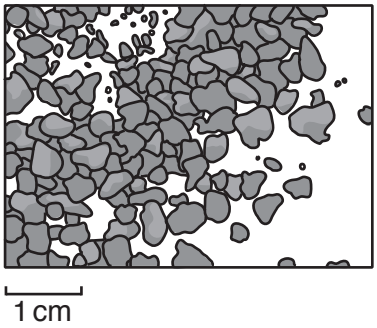
.....

..... [3]

(c) In April 2010, Eyjafjallajökull volcano erupted in the south of Iceland. The eruption continued for 6 weeks.

A large ash cloud spread across Iceland, the Atlantic Ocean and the European mainland. The ash cloud disrupted air traffic all around the world and approximately 100 000 flights were cancelled.

The diagram shows a sample of ash from the ash cloud.



The ash fall caused considerable damage to farmland used for crops and grazing animals.

The volcano is under a glacier and the eruption caused rapid melting of snow and ice. This resulted in flooding of river valleys, which also damaged farmland.

(i) Suggest reasons why flights were cancelled during this eruption.

.....

.....

.....

..... [2]

(ii) Explain why the eruption damaged farmland.

.....

.....

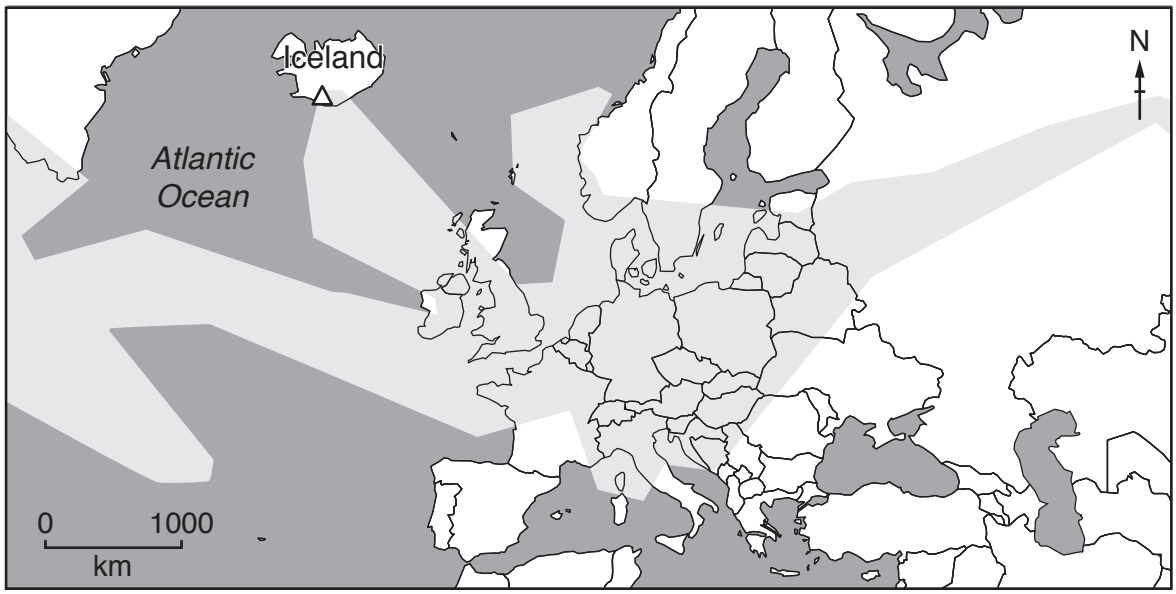
.....

..... [2]

© UCLES 2019

(iii) Iceland is approximately 300 km from north to south.

The map shows the extent of the ash cloud produced by the eruption.



Key

△ Eyjafjallajökull volcano

ash cloud

Suggest reasons why people in the north of Iceland were mostly unaffected by the eruption.

.....

.....

.....

..... [2]

(iv) Iceland has an emergency plan for volcanic eruptions.

In the 2010 eruption, an early warning system was set-up to alert all mobile (cell) phones near the volcano on the south coast. A text (SMS) alert was sent out in three different languages to all mobile phone users warning them of the eruption.

Discuss the benefits and possible limitations of this type of early warning system.

benefits .....

.....

.....

.....

limitations .....

.....

.....

.....

[4]

(v) Ice cores are used to provide information on volcanic eruptions that happened hundreds of years ago.

The photographs show an ice core being drilled from deep within the snow and ice.



Suggest how the ice cores are used to provide information on volcanic eruptions.

.....

..... [1]

(d) The volcanic explosivity index (VEI) is a measure of the explosiveness of volcanic eruptions. A VEI value of 0 is the least explosive and a VEI value of 8 is the most explosive.

The table gives information on the VEI value for some eruptions for one volcano in Iceland.

VEI value	number of eruptions
unknown	24
0	11
1	3
2	14
3	1
4	1
5	0
6	1
7	0
8	0

(i) Describe what the table shows about the eruptions from this volcano.

.....

.....

.....

..... [2]

(ii) Suggest **two** reasons why the VEI value is unknown for 24 eruptions from this volcano.

1 .....

.....

2 .....

.....

[2]

[Total: 21]

3 **(a)** The percentage of land covered by trees in Iceland has decreased since humans settled on the island. Some estimates suggest that coverage has decreased from 40% to 1%.

(i) Explain how human activity can lead to deforestation.

.....

.....

.....

..... [2]

(ii) Soil erosion is one impact of deforestation.

State **three** other impacts of deforestation.

1 .....

2 .....

3 .....

[3]

(iii) Describe **two** ways forests can be sustainably managed.

1 .....

.....

2 .....

.....

[2]

(b) In the 1960s, the Icelandic Forestry Service planted Alaskan lupine plants to help prevent soil erosion.

Alaskan lupine plants put nitrogen compounds back into the soil.

(i) Explain why adding nitrogen compounds to soil is a benefit to farming.

.....

.....

.....

..... [2]

© UCLES 2019

(ii) The fact sheet shows some information about the Alaskan lupine plant.

Fact sheet about the Alaskan lupine plant

The Alaskan lupine plants have spread to many areas of Iceland.

They grow up to 60 cm tall and create a canopy over shorter native plants (plants that grow naturally in Iceland), such as the bilberry plant, which grows up to 45 cm tall.

The leaves of the Alaskan lupine plant have a bitter taste and are not eaten by animals.



In some areas of Iceland, all the Alaskan lupine plants have died after 20 years and have naturally been replaced by other plant species that thrive in the nitrogen rich soil left behind. However, this has not happened everywhere.

A student says, 'The Alaskan lupine plant is a threat to biodiversity in Iceland.'

To what extent do you agree with this statement? Give reasons for your answer.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(iii) The student wanted to estimate the population of Alaskan lupine plants in a field, using a quadrat.

Describe how the student could use a quadrat to estimate the population of Alaskan lupine plants in the field.
Include any other equipment the student needs and how they should process the results.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

[Total: 18]

BLANK PAGE

© UCLES 2019

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

© UCLES 2019