Cambridge International **AS Level**

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

8085576899

ENVIRONMENTAL MANAGEMENT **8291/11**

Paper 1 Lithosphere and Atmosphere **October/November 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 **10** printed pages and **2** blank pages.

Cambridge Assessment International Education

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 (a) (i) Define the term *weathering*.

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..... [1]

(ii) Describe **one** difference between chemical and mechanical (physical) weathering.

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..... [2]

(iii) Table 1.1 includes descriptions for types of mass movement.

Table 1.1

description of mass movement type	type of mass movement
A rapid and sudden movement of soil which occurs on steep slopes following heavy rain.	
A rapid, dry free fall of rock from a steep cliff.	
A rapid, down-slope movement of material which moves along a curved surface.	
A slow movement that happens due to the expansion and contraction of soil caused by wet and dry conditions.	

Complete the table by choosing a type of mass movement from the box to match each of the descriptions in the table.

rock fall	soil creep	solifluction
mudflow	rotational slumping	

[3]

(b) Fig. 1.2 is an article on the Nevado del Ruiz mudflow (lahar).

Eruption causes disastrous mudflow

More than 23 000 people are dead in the town of Armero, Colombia.

The Nevado del Ruiz volcano, in the Andes mountain range, had been studied in recent months by scientists who reported earth tremors, seismic activity and emissions of steam and gas.

A small eruption produced some ash and pumice. Four hours later, lava began to erupt with pyroclastic flows (a mix of hot rock, ash and gases at over 1000 °C) and more ash. The ice cap of the 5400 m volcano exploded and the ice melted causing rivers to overflow. This released a huge torrent of water, mud and debris down the river valleys. By the time it reached the town of Armero a mudflow nearly 40 m high and travelling at 50 km per hour swept through the town with devastating effects.

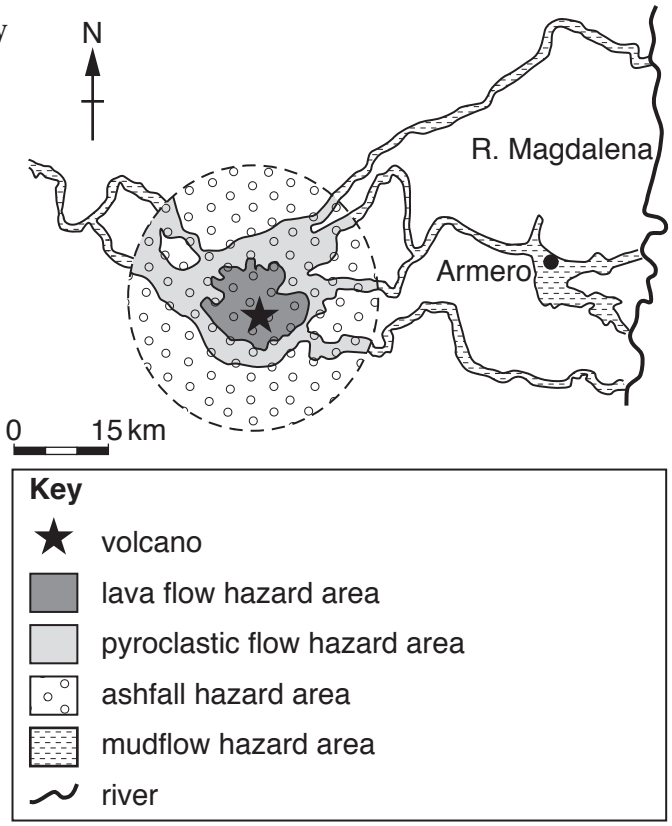

Fig. 1.2

(i) Describe how the sequence of events in Fig. 1.2 caused a mudflow.

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..... [3]

(ii) With reference to Fig. 1.2 explain **two** early warning signs that suggested to the scientists that the volcano was about to erupt.

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..... [4]

(iii) Suggest **two** reasons why people who lived in this high-risk location were reluctant to leave their homes, even though there were clear warning signs that the volcano was about to erupt.

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..... [2]

(iv) With reference to Fig. 1.2 suggest reasons for the patterns of the different hazard areas around the Nevado del Ruiz volcano.

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..... [5]

[Total: 20]

2 **(a)** Fig. 2.1 shows the relationship between temperature and altitude with the atmospheric zones labelled.

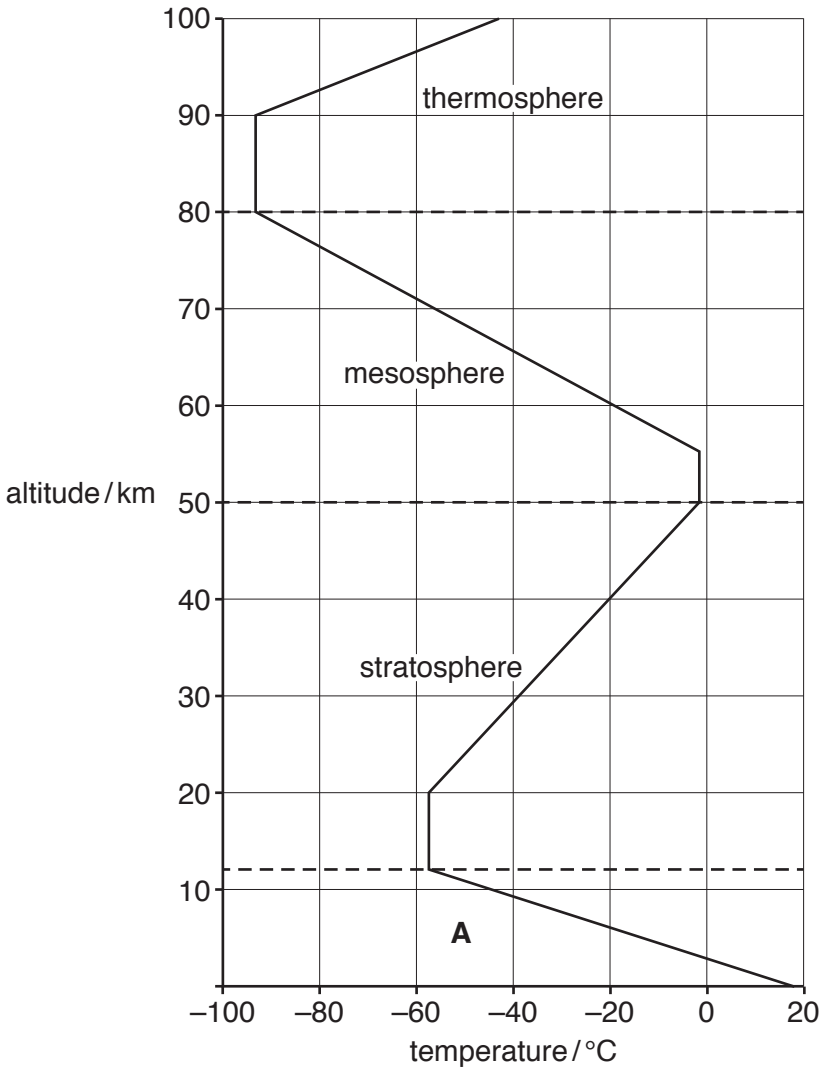

Fig. 2.1

(i) Name the atmospheric zone labelled **A** in Fig. 2.1.

..... [1]

(ii) Use Fig. 2.1 to describe the temperature variation in the atmosphere.

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..... [3]

[Turn over

(iii) State and explain how air pressure changes with increasing altitude.

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..... [3]

(iv) Name the type of radiation absorbed by the ozone layer.

..... [1]

(v) State **two** risks to humans from exposure to the type of radiation absorbed by the ozone layer.

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..... [2]

(vi) Describe strategies humans have taken to reduce damage to the ozone layer.

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..... [4]

(b) Fig. 2.2 shows an airport using strategies to reduce noise pollution levels for the surrounding settlements.

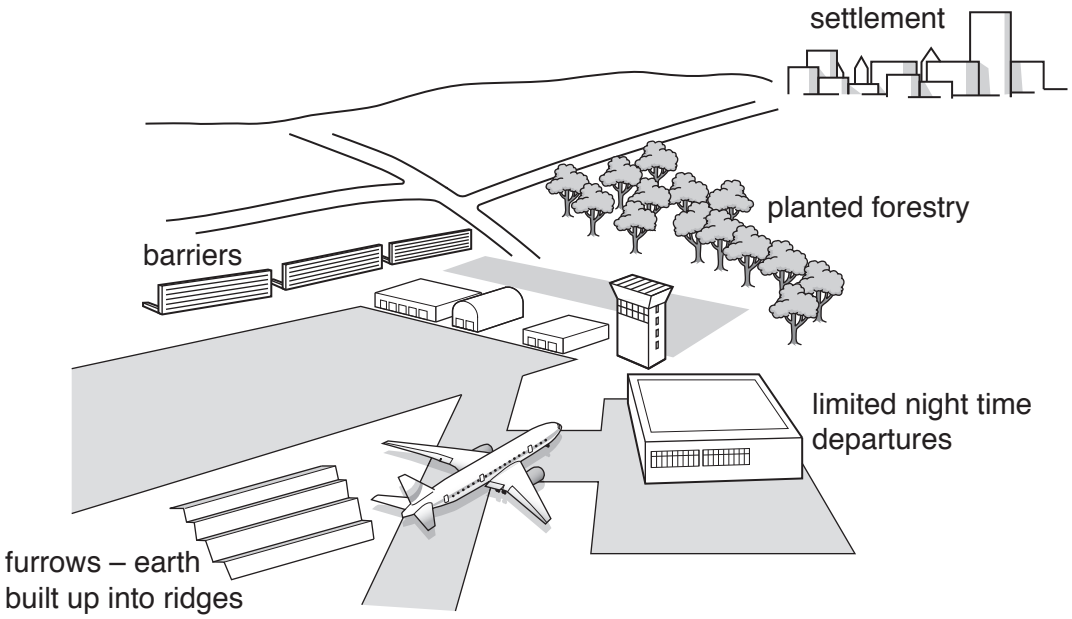

Fig. 2.2

Explain how strategies reduce noise pollution from transport in urban areas.

In your answer you may refer to the strategies in Fig. 2.2 and other strategies that are used to reduce noise pollution from transport in urban areas.

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..... [6]

[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 graph showing how the speed of seismic waves varies with depth below the Earth's surface and a diagram of the structure of the Earth.

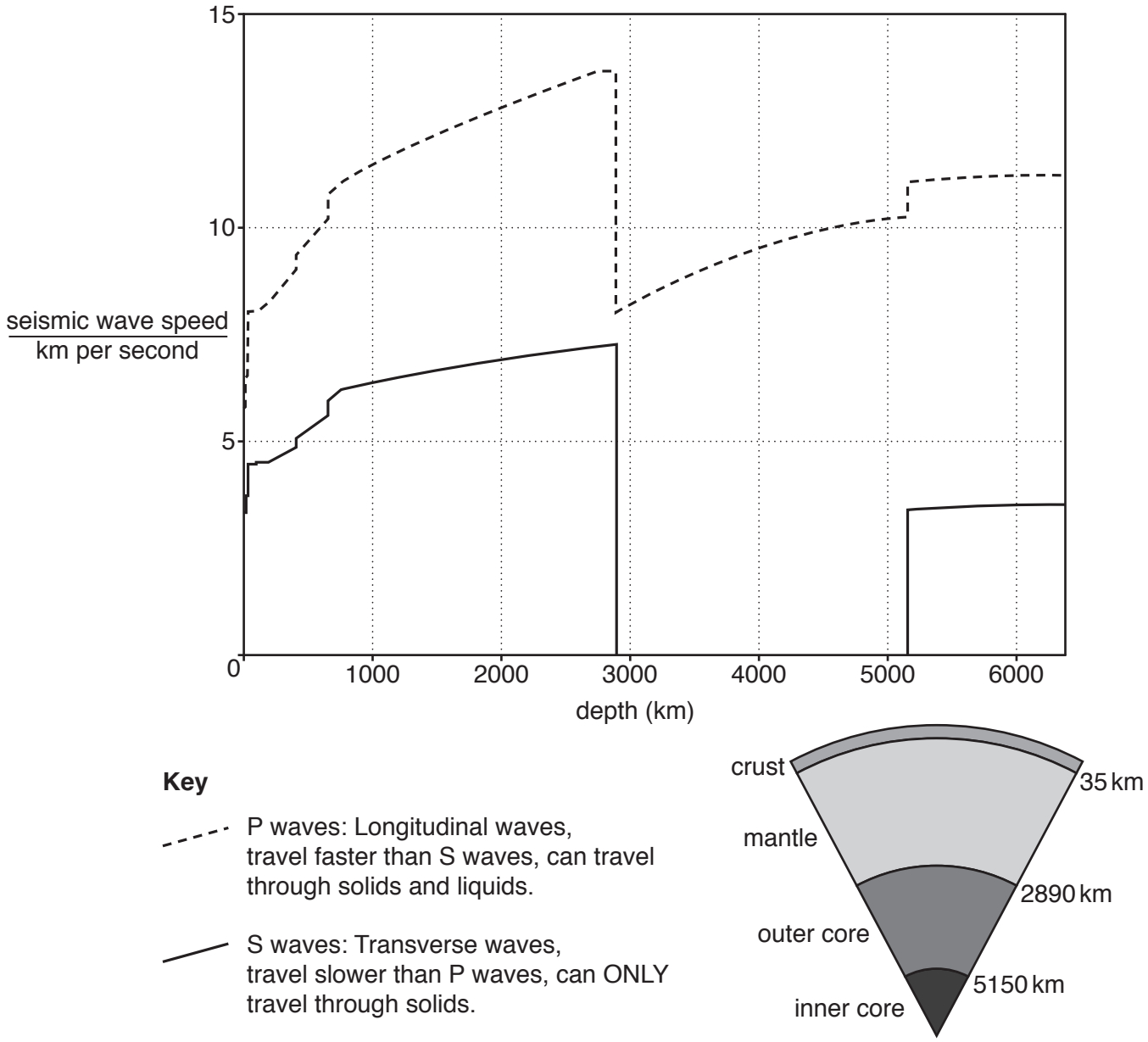

Fig. 3.1

(a) With reference to Fig. 3.1, describe how variation in seismic wave speed provides evidence of the internal structure of the Earth. [10]

(b) Assess the different strategies to limit damage and loss of life caused by earthquakes, using examples from countries at contrasting levels of economic development. [30]

[Total: 40]

4 Fig. 4.1 is two maps of Africa. Map **A** shows the level of risk of death from tropical cyclones (hurricanes), floods and landslides. Map **B** shows population density.

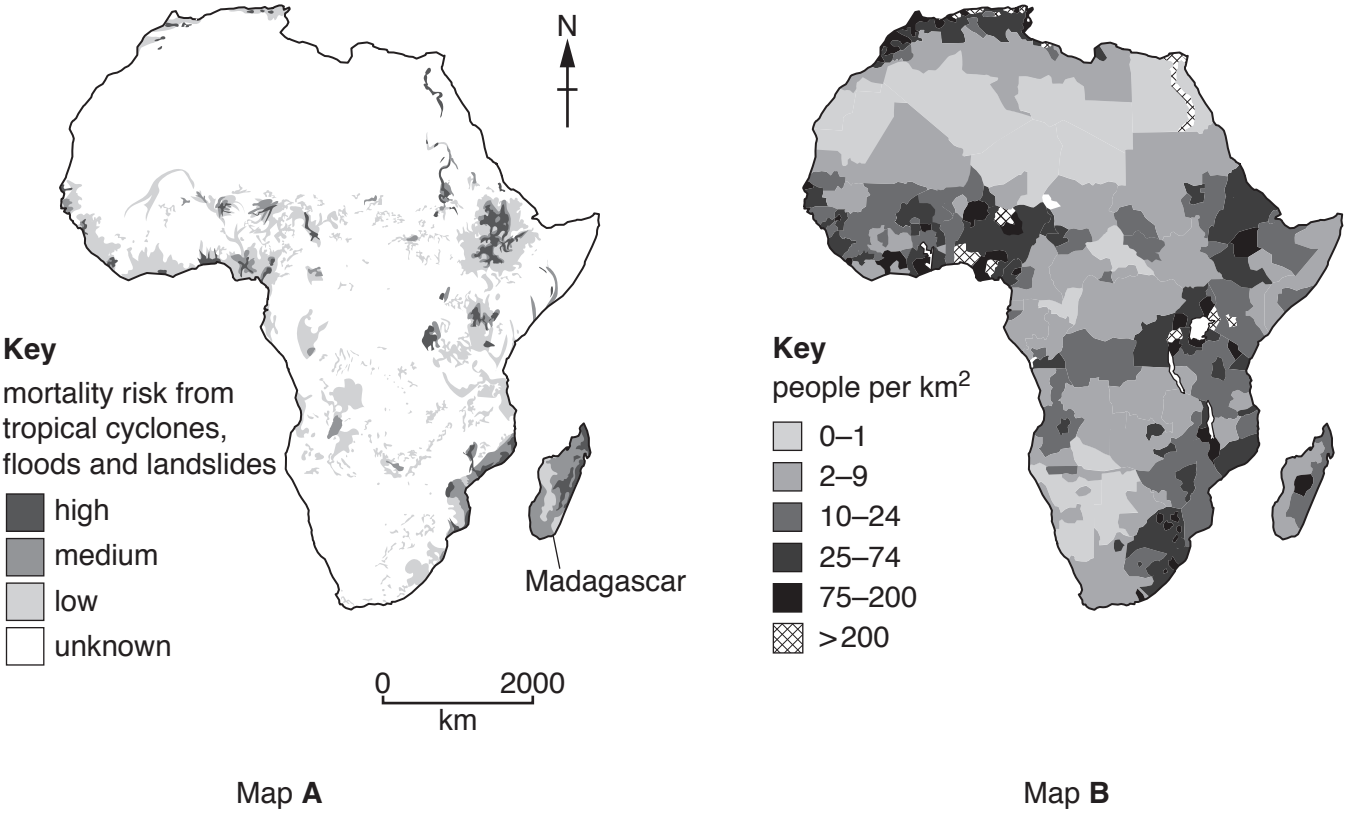

Fig. 4.1

(a) With reference to Fig. 4.1 describe and explain the pattern of the level of risk of death caused by tropical cyclones (hurricanes), floods and landslides. [10]

(b) 'More economically developed countries should manage the atmospheric pollution they cause because it is less economically developed countries that suffer its consequences.'

With reference to examples, discuss to what extent you agree with this statement. [30]

[Total: 40]

5 Table 5.1 shows how confident scientists are that damage to some environments in different regions of the world is caused by climate change.

Table 5.1

	damaged environments			
region	glacier environments	rivers	terrestrial ecosystems	marine ecosystems
Europe	4	1	2	3
North America	4	4	3	4
Africa	4	3	3	2
Central and South America	4	4	1	4

Key
scientists' level of confidence
1 = very low
2 = low
3 = medium
4 = high

(a) Describe **three** ways scientists gather data and use this information to investigate environmental damage.

With reference to Table 5.1, describe the different levels of confidence that scientists have that the damage to environments in different regions of the world is the result of climate change. [10]

(b) With reference to examples, describe how national parks can help with the management and sustainability of resources.

Discuss the problems that may occur due to people wanting to use the land in a national park in different ways. [30]

[Total: 40]

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