



# Cambridge International AS Level

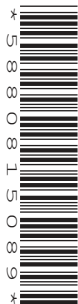
CANDIDATE  
NAME

CENTRE  
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## ENVIRONMENTAL MANAGEMENT

8291/13

Paper 1 Lithosphere and Atmosphere

May/June 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	
<b>Section A</b>	
1	
2	
<b>Section B</b>	
<b>Total</b>	

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) Table 1.1 contains information on the structural components of the atmosphere.

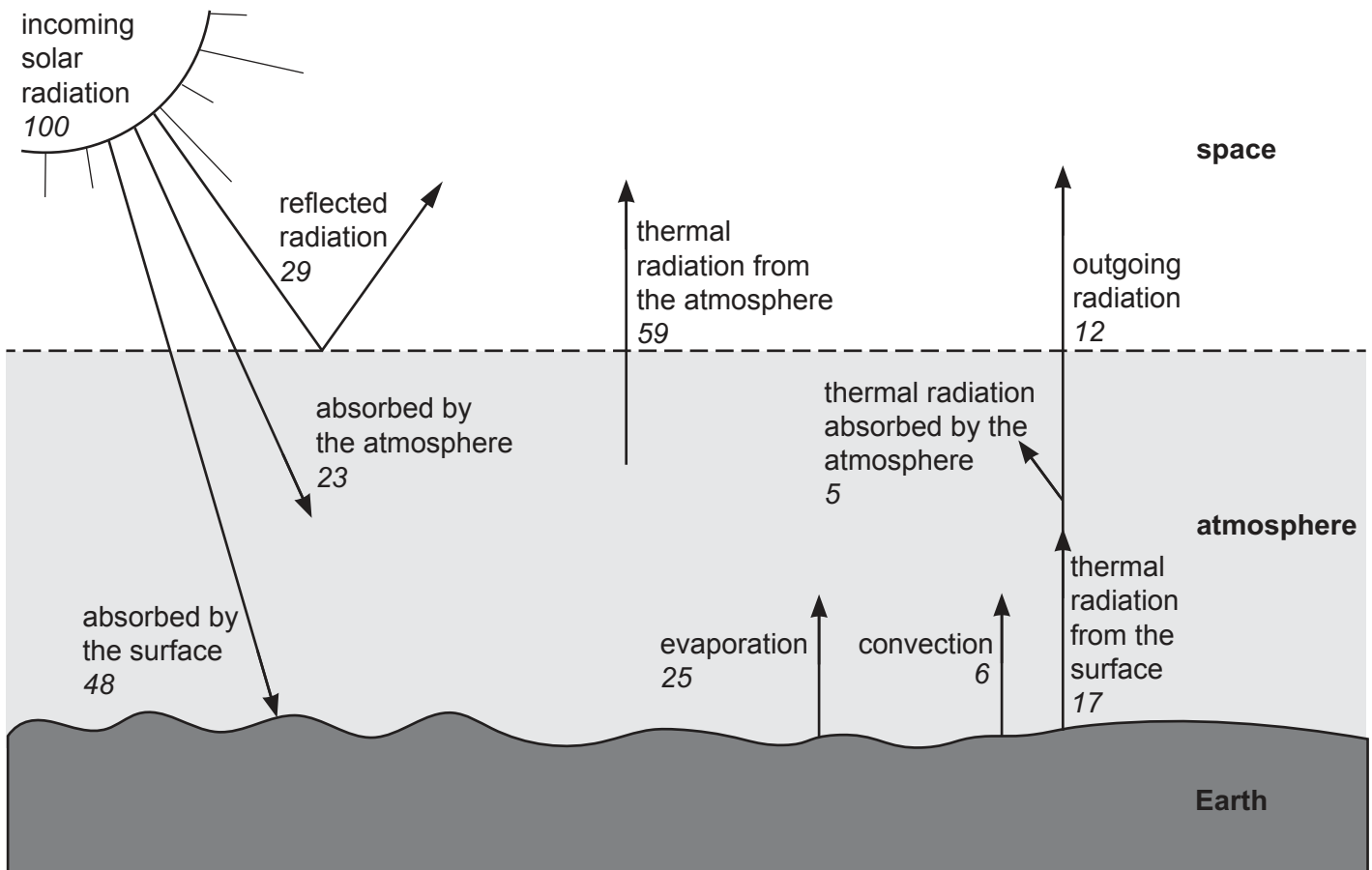
Table 1.1

atmospheric layer	altitude measured above the equator /km	max temperature /°C	min temperature /°C
	0–15	+18	–54
	15–50	–5	–54
Mesosphere	50–85	–5	–90
	85–500	–20	–90

Complete Table 1.1 by adding the names of the atmospheric layers.

[2]

- (b) Fig. 1.1 is a simplified diagram of the Earth's energy budget, with energy values shown in arbitrary units.



**Key**

29 energy value in arbitrary units

Fig. 1.1

- (i) Calculate the percentage of the energy absorbed by the surface which is transferred to thermal radiation from the surface. Use data from Fig. 1.1.

.....% [2]

- (ii) Describe how the balance between incoming solar radiation and radiation transferred to space is maintained in *'the Earth's energy budget'*. Refer to Fig. 1.1.

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..... [4]

- (iii) Describe the impact of an increase in greenhouse gases on the heat and energy in the atmosphere. Refer to Fig. 1.1.

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..... [4]

- (iv) Name two scientific methods used to provide evidence that *'the Earth's energy budget'* is changing.

State how each method is used to provide this evidence.

method 1 .....

how method provides the evidence .....

.....

method 2 .....

how method provides the evidence .....

.....

[4]

- (v) Outline ways in which humans are responsible for changes in *'the Earth's energy budget'*.

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[4]

[Total: 20]

2 (a) Describe how chemical processes can cause weathering of rocks.

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..... [2]

(b) Fig. 2.1 is an extract from a newspaper article.

**January 2018:** Mudflows in the Saint Ynez Mountains of California have caused destruction. California’s communities were covered with a flow of knee-high mud.

Before the mudflows, many of the surrounding slopes were black and covered with ash as the result of large wildfires destroying vegetation in September 2017.

**Fig. 2.1**

(i) Define the mass movement term *mudflow*.

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..... [2]

(ii) Suggest how the ‘wildfires destroying vegetation’ in Fig. 2.1 may have increased the risk of mass movement in the Saint Ynez Mountains.

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..... [4]

(iii) Describe how natural processes, other than loss of vegetation, can cause mass movement on slopes.

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..... [4]

(iv) Afforestation is one strategy used to reduce the frequency of mass movement on slopes.

Suggest one **other** strategy and explain how this strategy reduces the frequency of mass movement on slopes.

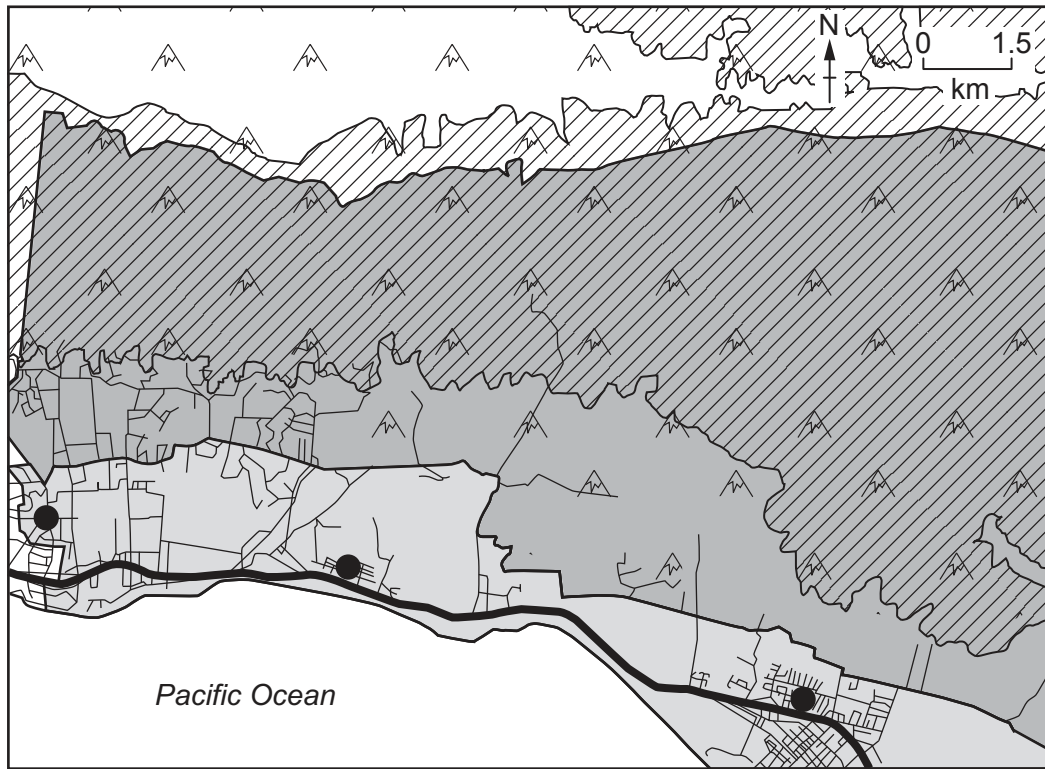
strategy .....

explanation .....








..... [2]



(c) Fig. 2.2 is a map showing potential source areas for mudflows and the associated evacuation zones around the Saint Ynez Mountains.



**Key**

- |   |                       |   |                    |
|---|-----------------------|---|--------------------|
|  | mudflow source area   |  | major road         |
|  | compulsory evacuation |  | minor road         |
|  | voluntary evacuation  |  | mountainous region |
|  | settlement            |   |                    |

**Fig. 2.2**

Explain how mapping hazards can help reduce the impact of mass movement events on the damage and loss of life in the region shown in Fig. 2.2.

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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 diagram illustrating how acid rain can form.

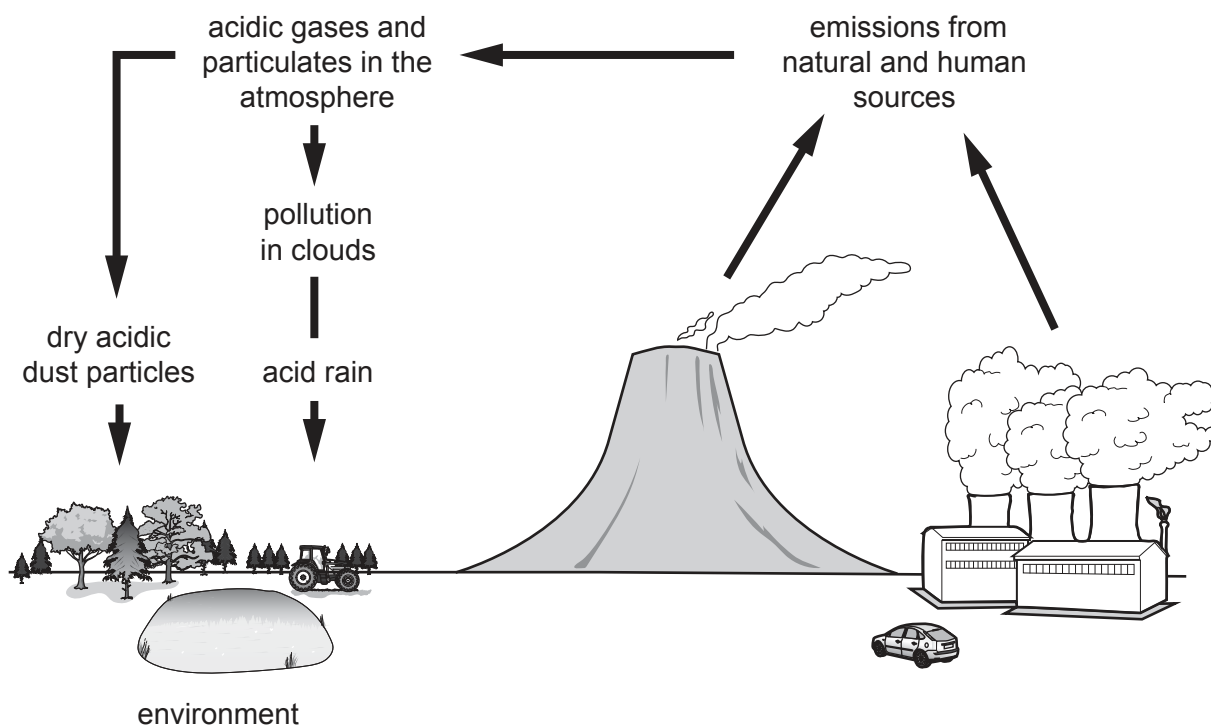


Fig. 3.1

- (a) Describe how emissions form acid rain and explain the impact this can have on the environment. Refer to Fig. 3.1 in your answer. [10]
- (b) 'The widespread impact of acid rain can only be managed successfully by strategies at a local level.'

Discuss the extent to which you agree with this statement.

[30]

[Total: 40]

4 Fig. 4.1 is a map of a town where a new coal-fired power station is planned.

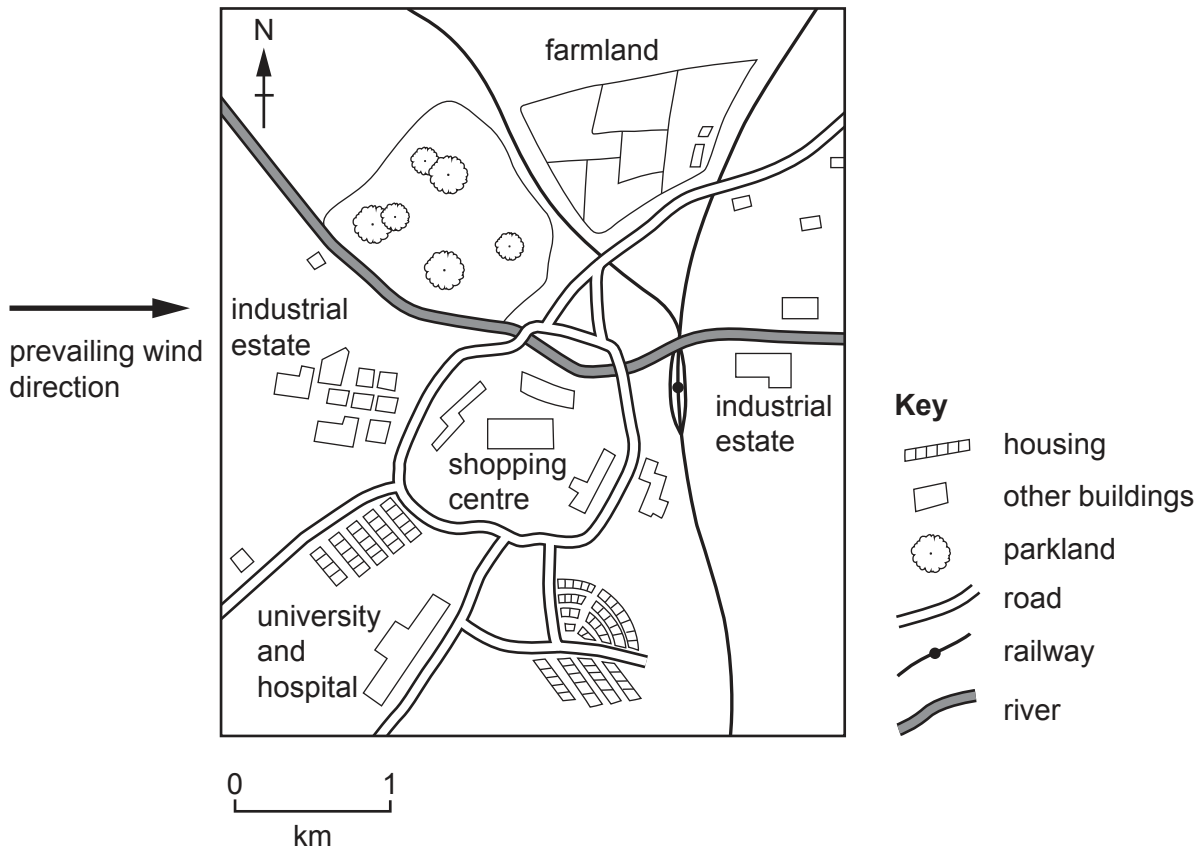


Fig. 4.1

- (a) Discuss the factors involved in planning the most suitable site for the coal-fired power station, with the aim to balance the environmental, social and economic impacts. Refer to Fig. 4.1. [10]
- (b) Discuss how pollution management strategies can affect levels of pollution within urban areas. Refer to examples from countries at different stages of economic development. [30]

[Total: 40]

5 Fig. 5.1 is a map of a plate boundary.

Fig. 5.2 shows the depths at which earthquakes occur at different distances along line A–B.

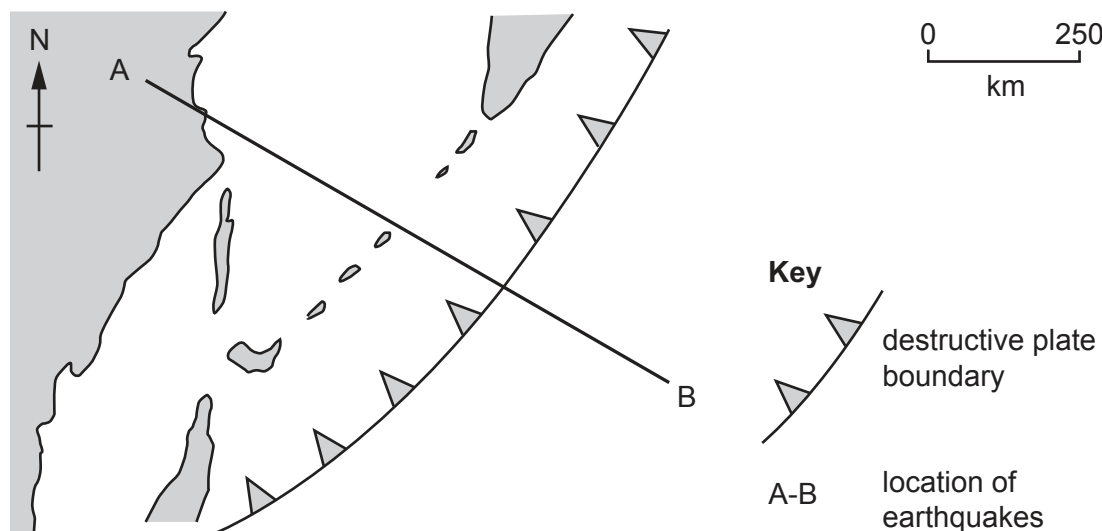


Fig. 5.1

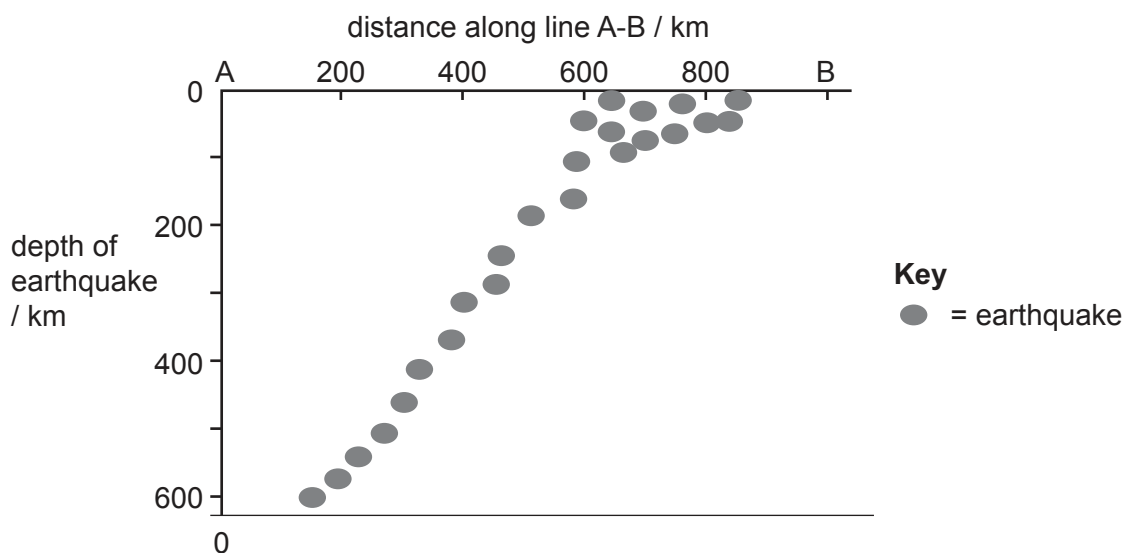


Fig. 5.2

- (a) Describe the pattern of the depth of earthquakes in Fig. 5.2. Suggest how the depth of earthquakes provides evidence for plate tectonics. [10]
- (b) Explain how earthquakes can cause a range of natural hazards and discuss the strategies used by different countries to prepare for these hazards. [30]

[Total: 40]

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