



# Cambridge International AS Level

CANDIDATE  
NAME

CENTRE  
NUMBER

--	--	--	--	--

CANDIDATE  
NUMBER

--	--	--	--



## ENVIRONMENTAL MANAGEMENT

8291/12

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.

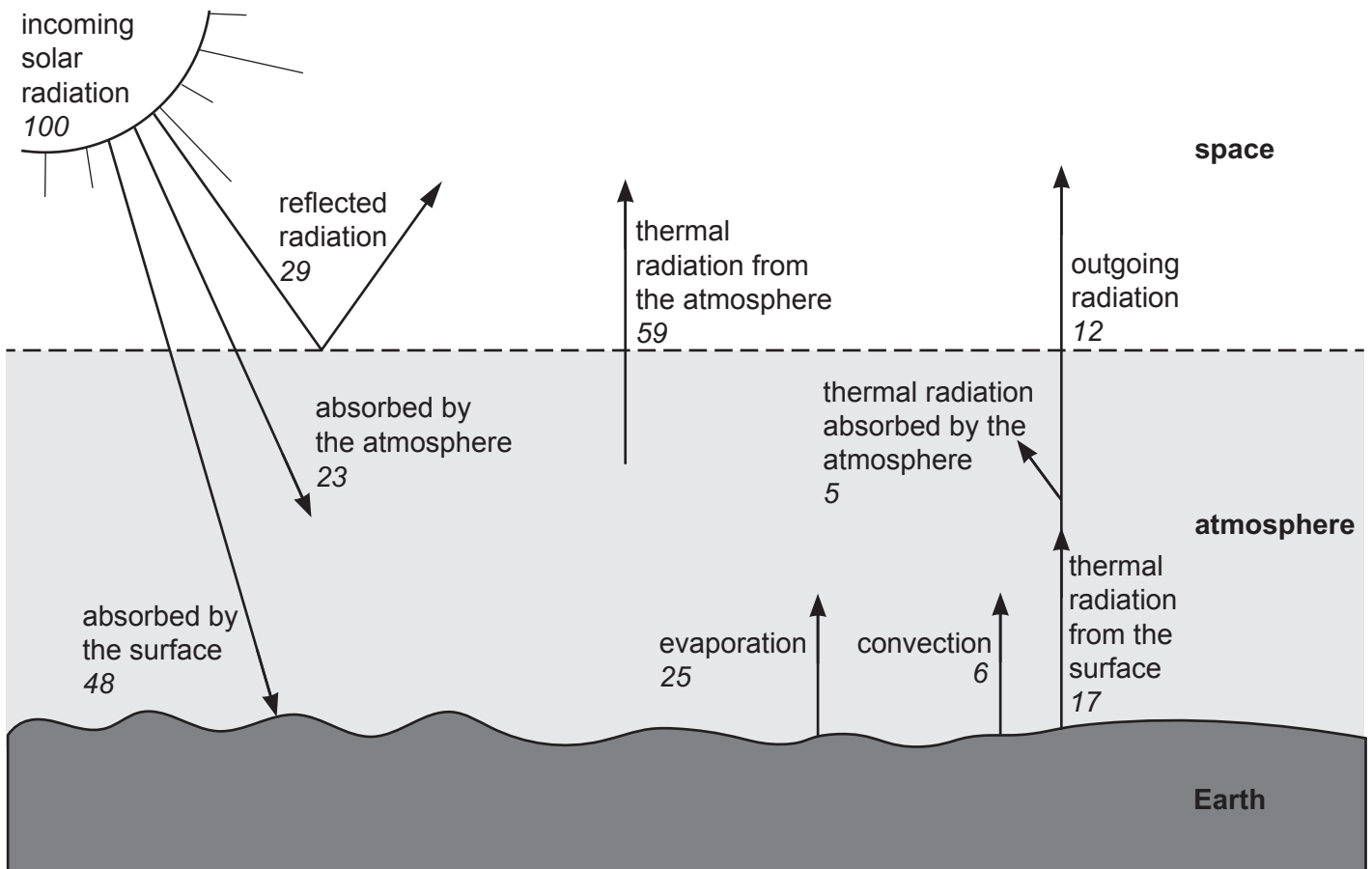
Table 1.1

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.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

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

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [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'*.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

[4]

[Total: 20]

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

.....  
.....  
.....  
..... [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*.

.....  
.....  
.....  
..... [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.

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

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

.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [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.

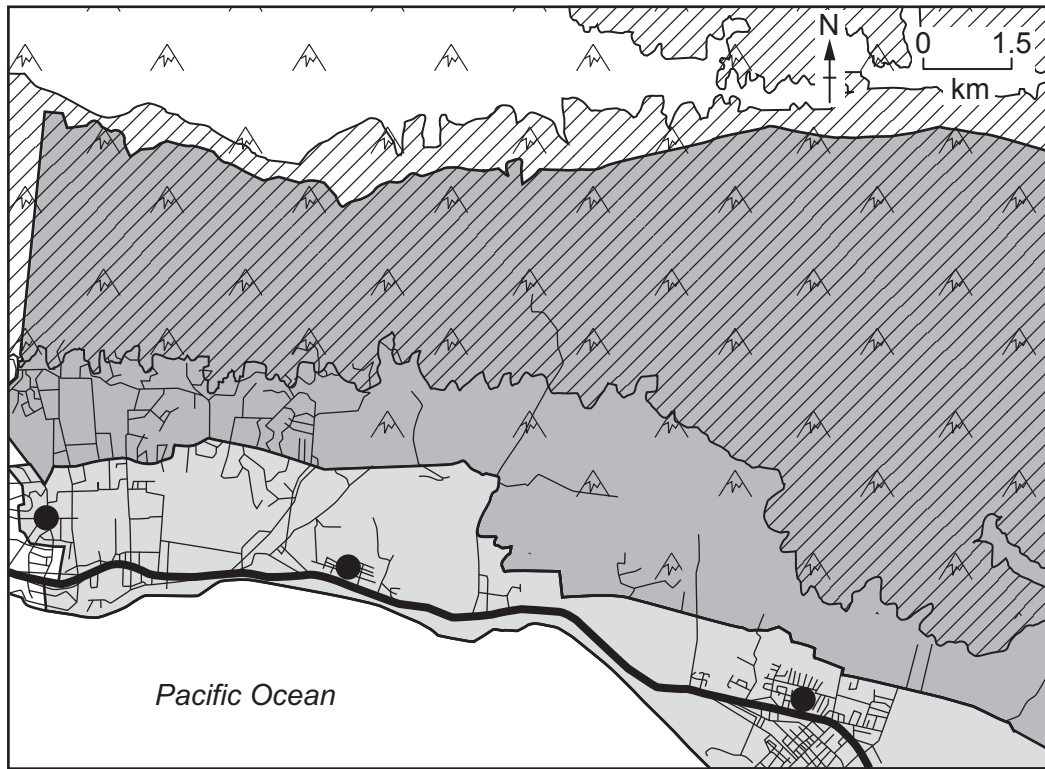
strategy .....

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.

.....

.....

.....

.....

.....

.....

.....

.....

.....



.....

.....

.....

..... [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.

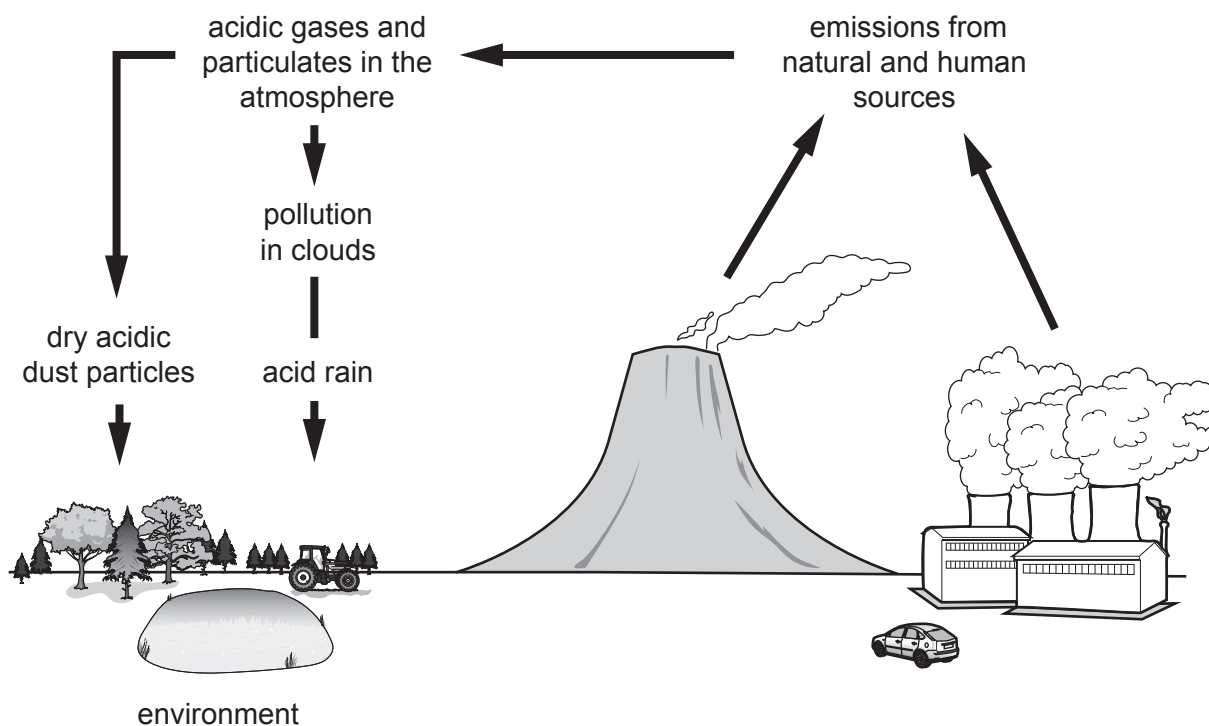


Fig. 3.1

- (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.

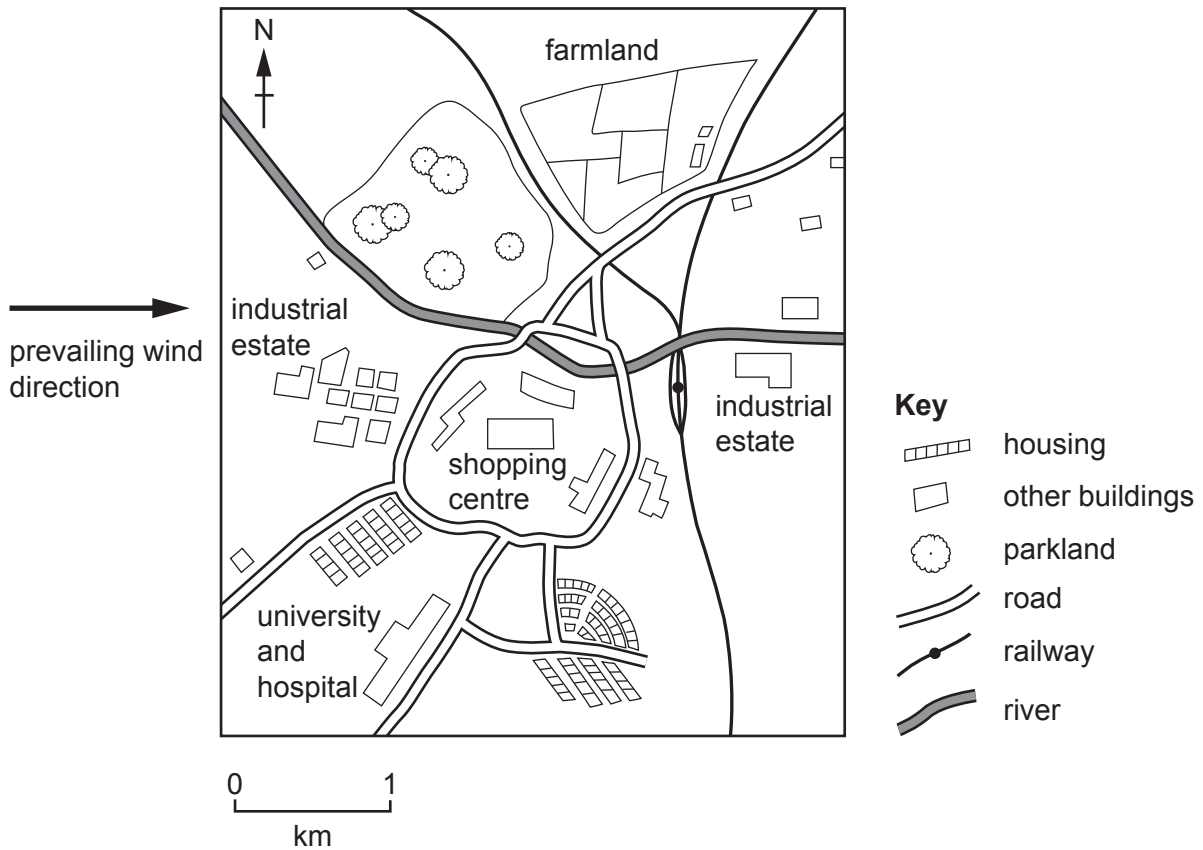


Fig. 4.1

- (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.

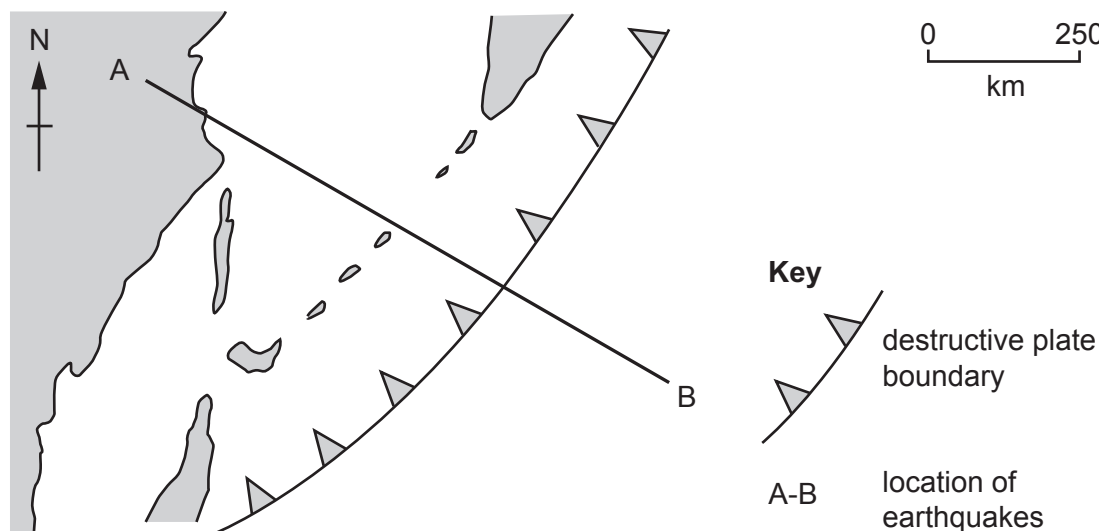


Fig. 5.1

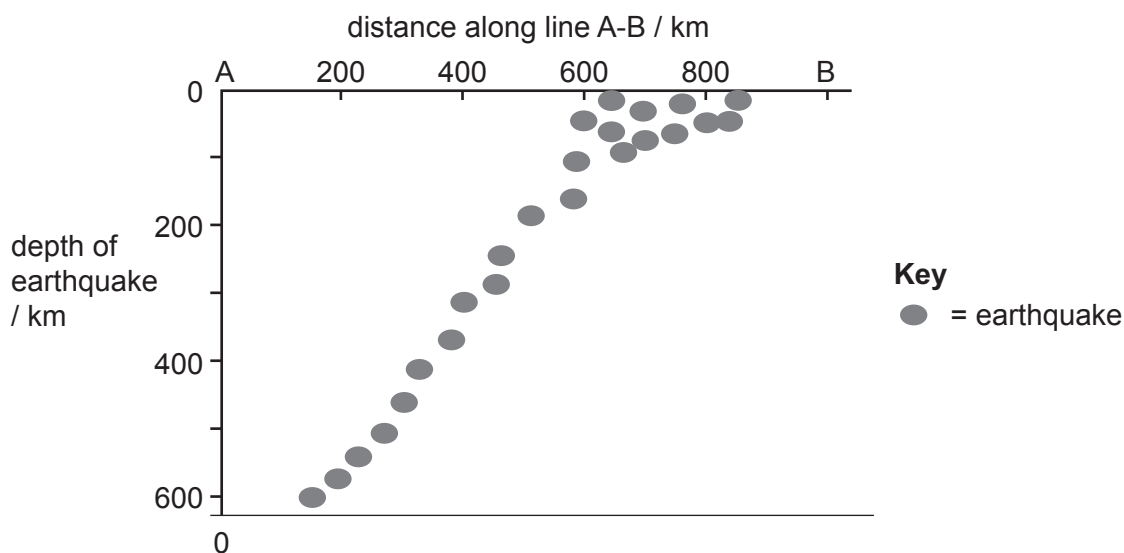


Fig. 5.2

- (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]

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](http://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.