



# Cambridge International AS Level

CANDIDATE  
NAME

CENTRE  
NUMBER

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## ENVIRONMENTAL MANAGEMENT

8291/11

Paper 1 Principles of Environmental Management

May/June 2024

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

### INSTRUCTIONS

- Section A: answer **all** questions.
- Section B: answer **one** question.
- 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.
- Write your answer to each question in the space provided.
- 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.

### INFORMATION

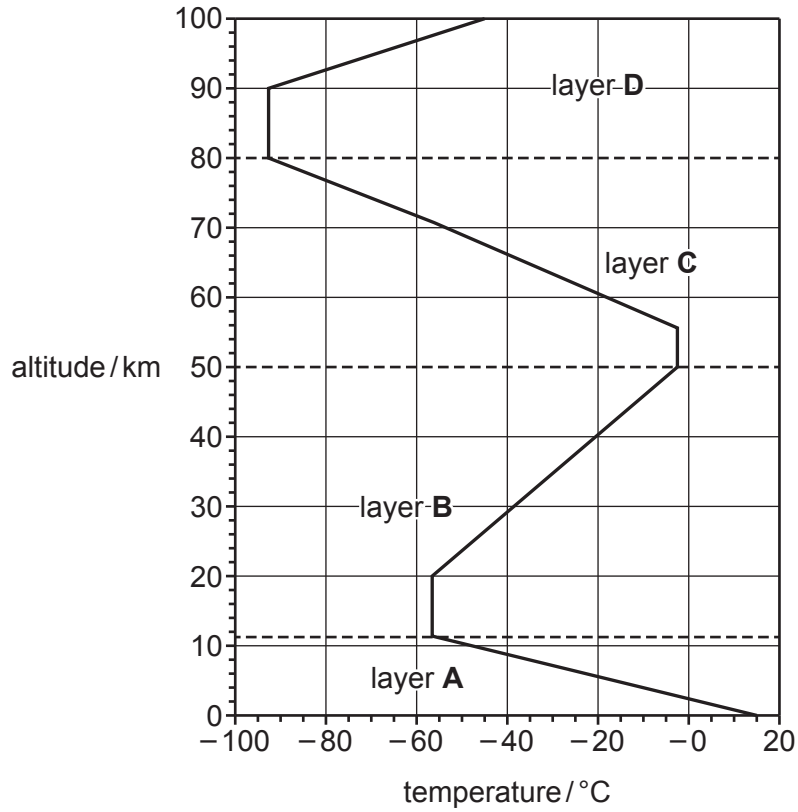
- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

**Section A**

Answer **all** questions in this section.

1 (a) Fig. 1.1 shows the structure of the Earth's atmosphere.



**Fig. 1.1**

(i) Identify the letter on Fig. 1.1 that represents the:

thermosphere .....

troposphere. ....

[2]

(ii) Describe the change in temperature shown in layers **A** and **B**.

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

[2]

(iii) Explain how the structure of layer **B** causes the temperature change between an altitude of 20 km and 50 km.

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.....  
.....  
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.....  
..... [3]

(b) (i) Outline how the natural greenhouse effect maintains the temperature of the Earth's atmosphere.

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

(ii) Suggest how eating a plant-based diet can reduce the enhanced greenhouse effect.

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

(iii) State **two other** ways that human activities contribute to the enhanced greenhouse effect.

1 .....

.....

2 .....

.....

[2]

[Total: 17]



- 2 In 1910, a volcano erupted on Savai'i island, Samoa. The area was covered with a layer of lava which cooled to form solid rock known as a lava field.

Fig. 2.1 shows plants growing on the lava field.



**Fig. 2.1**

(a) Fig. 2.1 shows a stage in the primary succession of an ecosystem.

- (i) Identify **one** piece of evidence in Fig. 2.1 that shows this is primary succession.

..... [1]

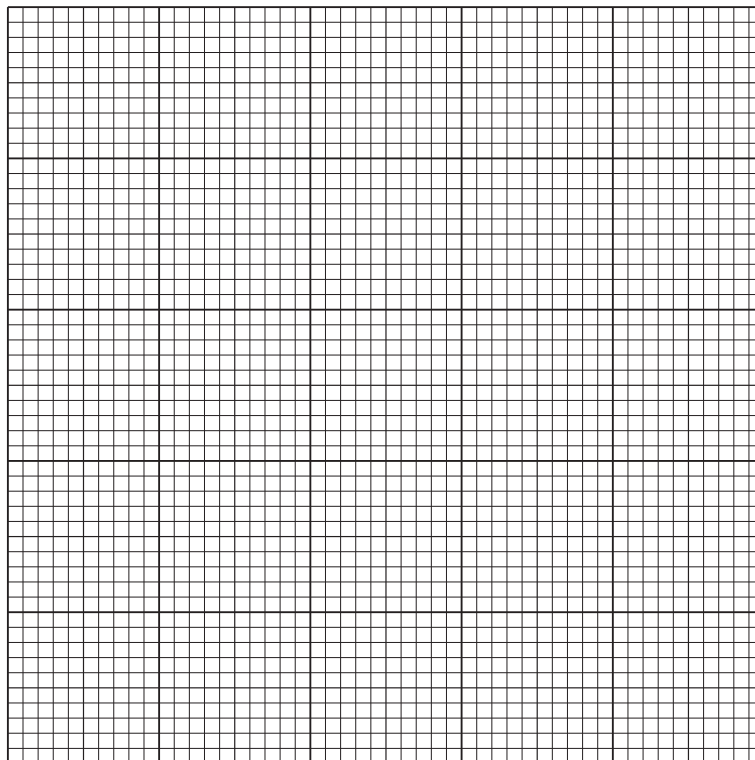


(b) Table 2.1 shows the net primary productivity for five ecosystems.

**Table 2.1**

<b>ecosystem</b>	<b>net primary productivity /g carbon m<sup>-2</sup> year<sup>-1</sup></b>
sand dune (large area of sand with very few plants)	15
forest	360
tundra	65
grassland	230
desert scrubland (large area of sand with small plants)	32

(i) Plot a bar chart to show the net primary productivity for the ecosystems shown in Table 2.1.



[4]



(ii) Predict the net primary productivity for the ecosystem shown in Fig. 2.1.

Explain your answer.

net primary productivity = ..... g carbon m<sup>-2</sup> year<sup>-1</sup>

explanation .....

.....

.....

.....

[3]

(iii) The productivity of an ecosystem can be expressed as net primary productivity or gross primary productivity.

Compare how gross primary productivity is different to net primary productivity.

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[4]

[Total: 18]





4 Fig. 4.1 shows a model for describing a country's energy sustainability.

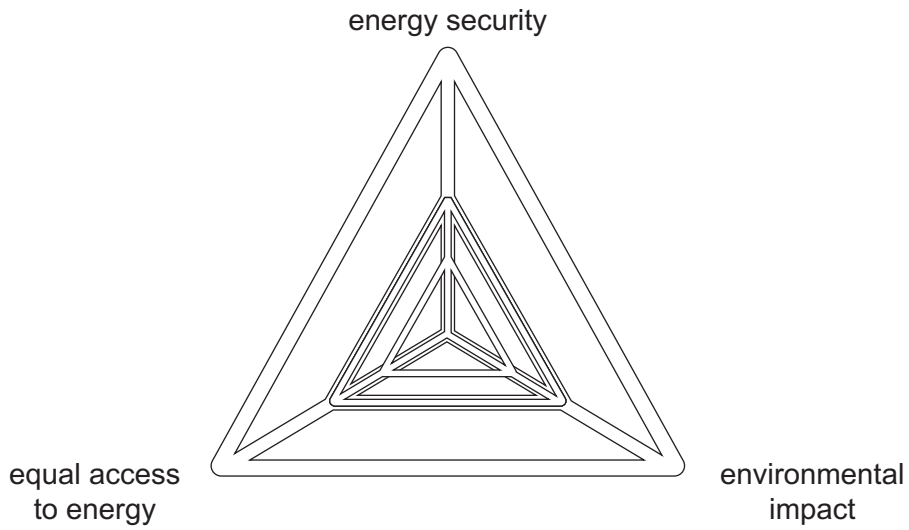


Fig. 4.1

(a) (i) Define the term sustainability.

.....  
..... [2]

(ii) Energy security can be short-term and long-term.

Describe long-term energy security.

.....  
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.....  
.....  
.....  
.....  
..... [3]

















