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ENVIRONMENTAL MANAGEMENT

8291/11

Paper 1 Principles of Environmental Management

May/June 2026

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. Do **not** use correction fluid or tape.
- 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.

Section A

Answer **all** questions in this section.

- 1 (a) Forests are a terrestrial biome.

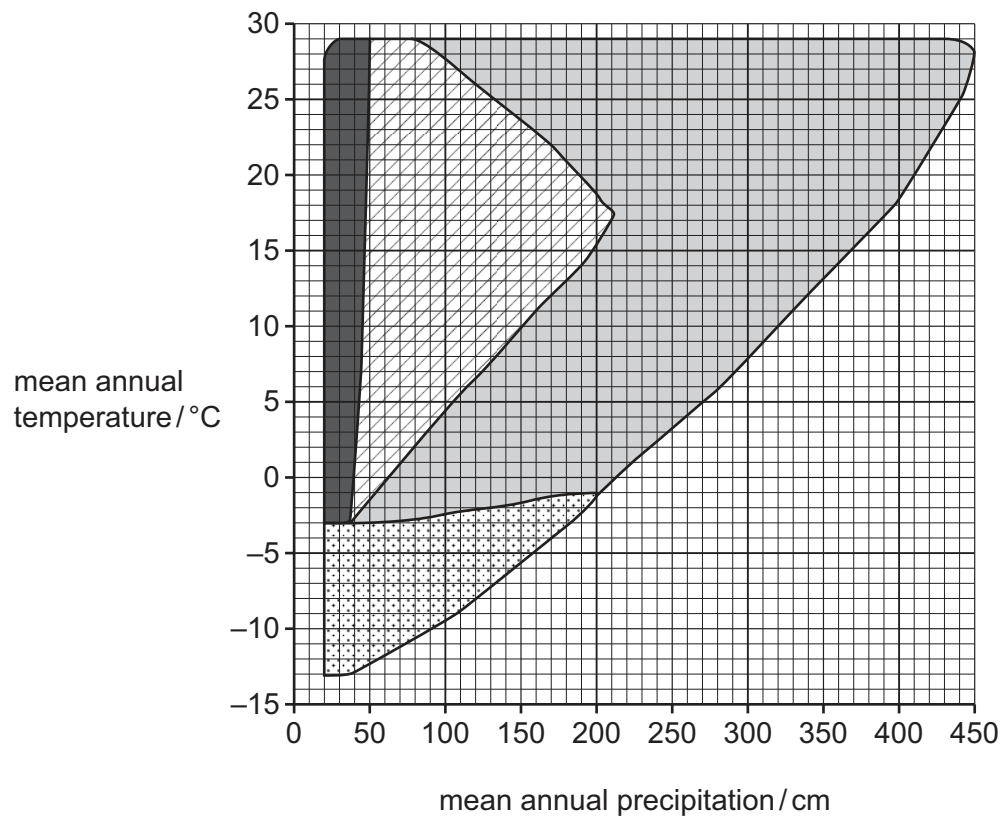
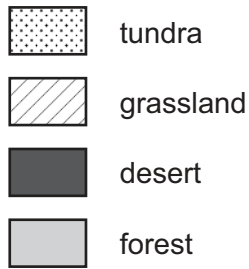
Tick (✓) the correct definition for a biome.

definition	✓
a community that interacts with their environment	
a group of populations that live in an area at one point in time	
an area with characteristic features, such as soil type and vegetation, that contains communities	
an area where an organism lives	

[1]



- (b) Figure 1.1 shows the mean annual temperatures and mean annual precipitations for four terrestrial biomes.

key**Figure 1.1**

- (i) Use Figure 1.1 to identify:

- the biome that has a mean annual precipitation of 300 cm
- the biome with the lowest mean annual temperature
- the highest mean annual precipitation for tundra. cm [3]

- (ii) Use Figure 1.1 to calculate the range for the mean annual temperature of deserts.

range = ... °C [2]

(c) Figure 1.2 shows secondary succession in a forest that has been impacted by fire.



Figure 1.2

Explain how the forest shown in Figure 1.2 will change over time.

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..... [5]



(d) The International Tropical Timber Organisation (ITTO) conserves the biodiversity of tropical forests.

(i) Describe **three** ways the ITTO conserves the biodiversity of tropical forests.

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2

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3

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[3]

(ii) The membership of the ITTO represents about 90% of the global tropical timber trade and more than 80% of the world's tropical forests.

A study found that 10% of global tropical forests were cut down between 2020 and 2021.

Suggest **three** reasons why the global area of tropical forest is decreasing.

1

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2

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3

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[3]

[Total: 17]



- 2 (a) Food waste reduces food security.

Define food security.

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..... [2]

- (b) Table 2.1 shows information about food waste in five countries.

Table 2.1

country	total mass of food waste per year / million tonnes	mass of food waste per person per year / kg
Australia	3	100
China	92	65
India	69	50
Russia	5	33
USA	19	59

- (i) A student concludes:

‘Australia has a greater effect on global food security than the other countries.’

Describe **one** piece of evidence from Table 2.1 that supports this conclusion and **one** piece of evidence that does **not** support this conclusion.

supports

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.....

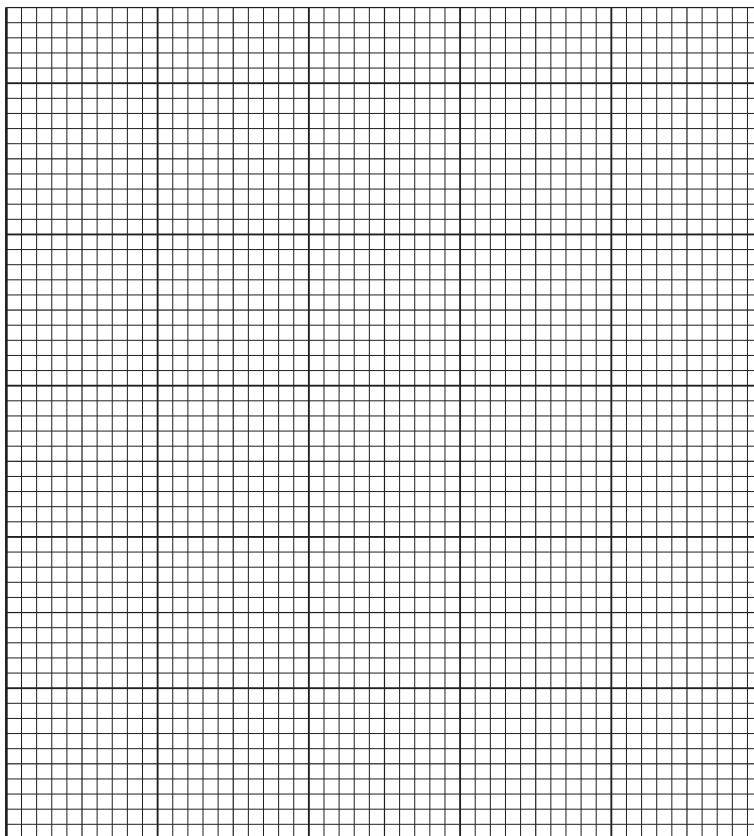
does **not** support

.....

..... [2]



- (ii) Plot a bar chart of the mass of food waste per person per year for the five countries shown in Table 2.1.



[4]



(c) (i) Food waste is often disposed of in landfill sites.

Suggest **two** negative impacts of disposing of food waste in landfill sites.

1

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2

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[2]

(ii) Food waste is used as animal feed.

Describe **three** limitations of using food waste as animal feed.

1

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2

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3

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[3]



(d) Increasing agricultural yields is one strategy to increase food security.

- (i) Describe benefits and limitations of using biological control as a strategy to increase agricultural yields.

benefits

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limitations

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[5]

- (ii) Irrigation provides water for crops.

Explain how irrigation increases agricultural yields.

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[2]

[Total: 20]





3 (a) Explain how nitrogen in the atmosphere forms acid deposition.

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..... [4]

(b) Acid deposition reduces the concentration of chlorophyll in plants.

Ecosystem productivity is the rate of production of biomass for an ecosystem.

(i) Suggest how acid deposition reduces ecosystem productivity.

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..... [4]

(ii) State **two** other impacts of acid deposition.

1

2 [2]

[Total: 10]



4 Figure 4.1 shows the albedo of the Earth's surface on 1 August 2021.

key

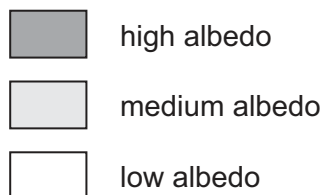


Figure 4.1

(a) Describe the distribution of the albedo on the Earth's surface shown in Figure 4.1.

..... [3]



(b) Albedo enhancement is a geo-engineering strategy to counteract climate change.

(i) Explain how albedo enhancement counteracts climate change.

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..... [3]

(ii) One albedo enhancement strategy is to create bubbles on the ocean surface using devices fitted to ships.

Scientists predict this will help to counteract climate change.

Suggest **three** limitations of this strategy to counteract climate change.

1

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2

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3

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..... [3]

(iii) Name **two** other geo-engineering strategies to counteract climate change.

1

2

[2]



(c) Adaptation to climate change is a strategy for managing climate change.

(i) Describe the strategy of adaptation to climate change.

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..... [1]

(ii) Describe **one** example of adaptation to climate change.

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..... [1]

[Total: 13]





Section B

Answer **one** question.

Either

- 5** 'Countries with low-income economies have a greater impact on climate change than countries with high-income economies.'

To what extent do you agree with this statement?

Give reasons and include information from relevant examples to support your answer. [20]

Or

- 6** Evaluate the success of reducing water usage as a strategy for managing water security.

Give reasons and include information from relevant examples to support your answer. [20]

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[illegible]

[illegible]



17

[illegible]

[illegible]



This image shows a full page of a handwriting practice worksheet. It consists of multiple rows of horizontal dashed lines spaced evenly down the page, providing a guide for letter height and placement. The background is plain white, and there are no other markings or text present.

This image shows a single page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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