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School name	
Given name/s	Attach your
Family name	barcode ID label here
External assessment 2023	Book of books used
	Question and response book

# Earth & Environmental Science Paper 2

#### Time allowed

- Perusal time 10 minutes
- Working time 90 minutes

# **General instructions**

- Answer all questions in this question and response book.
- Write using black or blue pen.
- QCAA-approved calculator permitted.
- Planning paper will not be marked.

# Section 1 (52 marks)

• 5 short response questions

# Section 2 (18 marks)

• 1 extended response question



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# Section 1

#### Instructions

- If you need more space for a response, use the additional pages at the back of this book.
  - On the additional pages, write the question number you are responding to.
  - Cancel any incorrect response by ruling a single diagonal line through your work.
  - Write the page number of your alternative/additional response, i.e. See page ...
  - If you do not do this, your original response will be marked.
- This section has five questions and is worth 52 marks.

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# **QUESTION 1 (7 marks)**

Refer to Stimulus 1 in the stimulus book.

a) Explain why groundwater is a renewable resource.

[1 mark]

[3 marks]

b)	Explain the change in recharge between 1970 and 2023. Support your response using	
	evidence from the graphs.	

c) Make a	justified prediction	about the future s	ustainability of gro	oundwater in the ba	asin. [3 m

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## **QUESTION 2 (9 marks)**

Refer to Stimulus 2 in the stimulus book.

a) Explain why volcanoes form in Iceland.

[3 marks]

In 2010, *Eyjafjallajökull* erupted with a volcanic explosivity index of 4 (0: non-explosive, 8: mega-colossal). The ash clouds produced disrupted air travel in Iceland and nearby countries.

b) Explain why there was no recorded reduction in global temperature associated with this eruption.

[2 marks]

c)	Predict another effect of the ash clouds. Explain your reasoning.	[2 m
1)		
d)	Explain a mitigation strategy Reykjavík could establish to reduce hazardous outcomes from a nearby volcanic eruption.	[2 m

## **QUESTION 3 (16 marks)**

Refer to Stimulus 3 in the stimulus book.

a) Determine whether the northern or southern basin is most likely to be experiencing drought. Support your response using evidence from the map.

[2 marks]

[4 marks]

b) Explain how dams are distributed in the Murray–Darling Basin. Support your response with evidence from the map.

:)	Identify a physical and biological strategy to reduce the impact of a future drought in the Murray–Darling Basin. Explain your reasoning.	[6 mark
)	Predict one impact of drought on a terrestrial ecosystem and one impact on an aquatic ecosystem in the Murray–Darling Basin. Explain your reasoning.	[4 mar
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# **QUESTION 4 (9 marks)**

Refer to Stimulus 4 in the stimulus book.

a) Identify the endpoint of the last glaciation period.

[1 mark]

b)	Identify the relationship between the type of pollen and global temperature in the last
	160 000 years. Support your response with evidence from the graphs.

[6 marks]

Explain one advantage of using pollen to indicate historical climate change. Support your response with evidence from the graphs.	[2 marks

#### **QUESTION 5 (11 marks)**

a) Explain the effect of land clearing on the composition of Earth's atmosphere. [4 marks]

Refer to Stimulus 5 in the stimulus book. b) Predict the impact on the composition of the atmosphere if the global methane budget stays the same. [4 marks]

c) Draw a conclusion about the significance of anthropogenic contributions to the methane budget and the effect on global temperatures. Explain your reasoning. [3 marks]

# Section 2

#### Instructions

- This section has one question and is worth 18 marks.
- Respond in 300–350 words.

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# **QUESTION 6 (18 marks)**

Refer to Stimulus 6 in the stimulus book.

a) Determine the financial value of the sample for all metals recoverable at the optimal pH for iron extraction. Show your working.

[8 marks]

The mining company decides to minimise its costs by extracting only two metals.

b) Determine an alternative pH to maximise the financial value of the sample for two recoverable metals. Show your working.

[8 marks]

) Which pH should the company use to process the sample? Justify your response.	[2 marks
END OF PAPER	

ADDITIONAL PAGE	FOR	<b>STUDENT</b>	RESPONSES
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Write the question number you are responding to.

#### ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.


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