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School code

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School name

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Family name

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Attach your  
barcode ID label here

Book

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of

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books used

External assessment 2022

Question and response book

# Earth & Environmental Science

## Paper 1

### Time allowed

- Perusal time — 10 minutes
- Working time — 90 minutes

### General instructions

- Answer all questions in this question and response book.
- QCAA-approved calculator permitted.
- Planning paper will not be marked.

### Section 1 (15 marks)

- 15 multiple choice questions

### Section 2 (27 marks)

- 5 short response questions





**DO NOT WRITE ON THIS PAGE**

**THIS PAGE WILL NOT BE MARKED**



# Section 1

## Instructions

- Choose the best answer for Questions 1–15.
- This section has 15 questions and is worth 15 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

	A	B	C	D
Example:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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	A	B	C	D
1.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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5.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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13.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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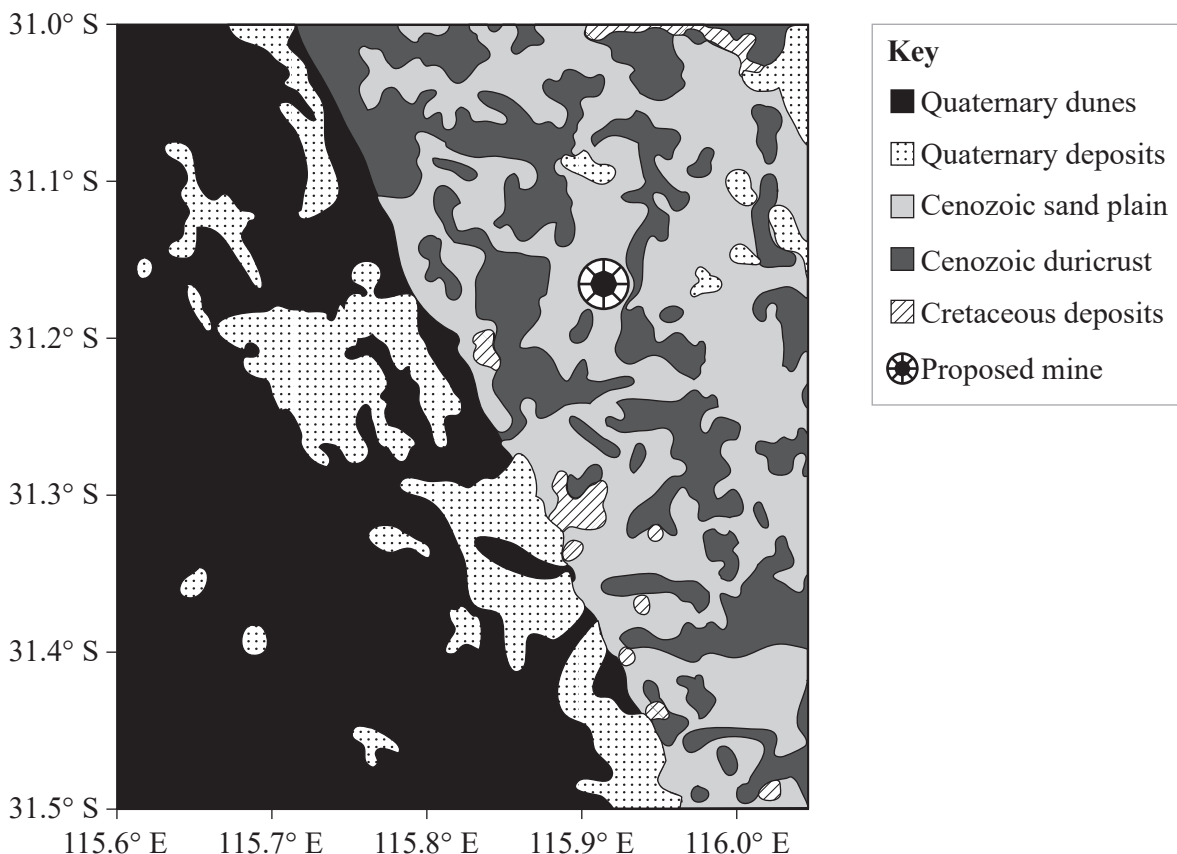
## Section 2

### Instructions

- Write using black or blue pen.
- 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 27 marks.

### QUESTION 16 (6 marks)

The diagram shows a surface geological map of a region where a mine to extract ilmenite, rutile, leucoxene and zircon is proposed.

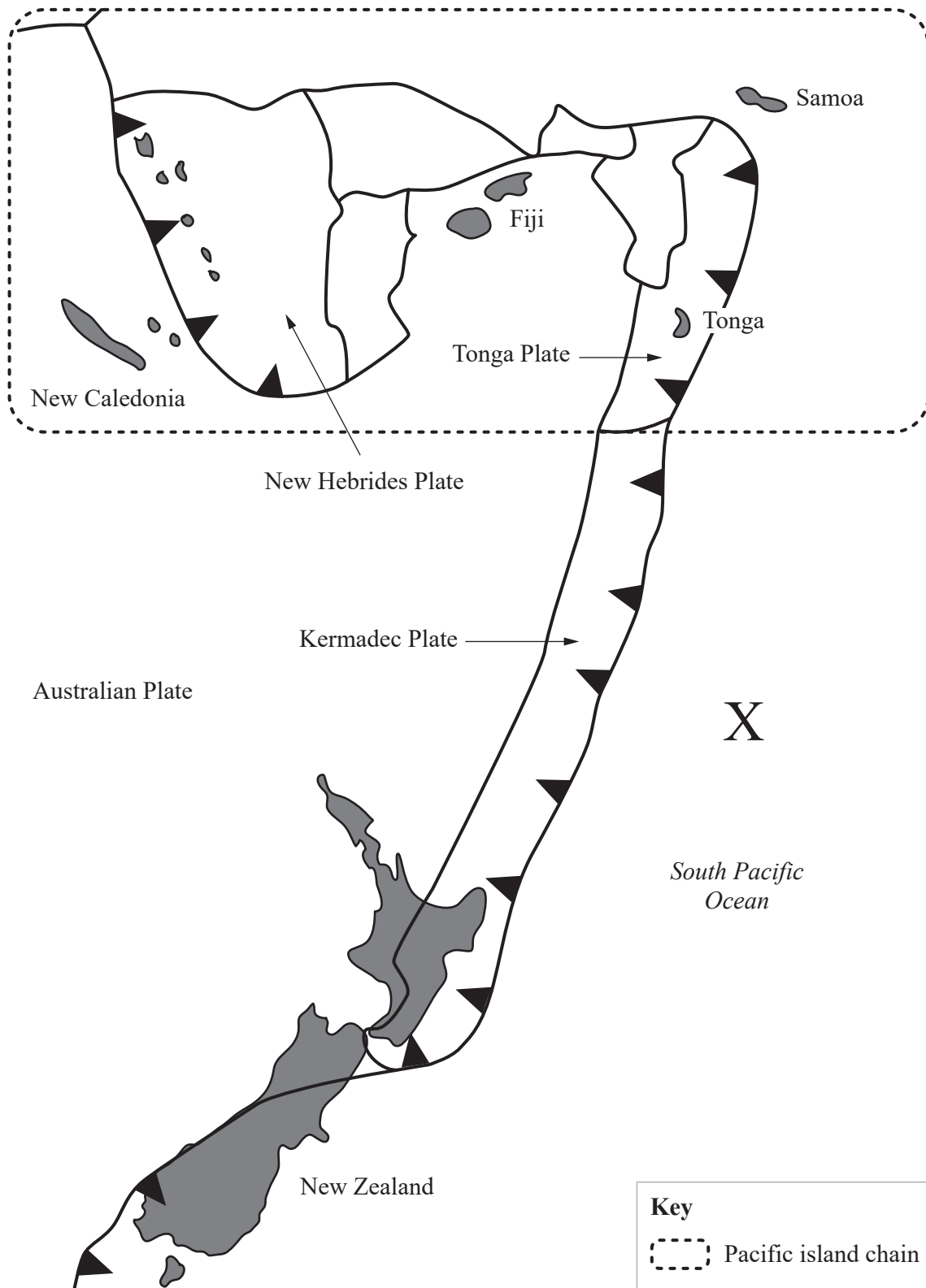


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**QUESTION 17 (5 marks)**

The map shows tectonic plates in the Western Pacific region.



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a) Identify the plate denoted by X.

[1 mark]

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b) Describe the type of plate boundary interaction between the Kermadec Plate and X.

[1 mark]

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c) Identify the reasons tsunamis are likely to occur in the Pacific island chain. Explain why tsunamis are a significant hazard for the region.

[3 marks]

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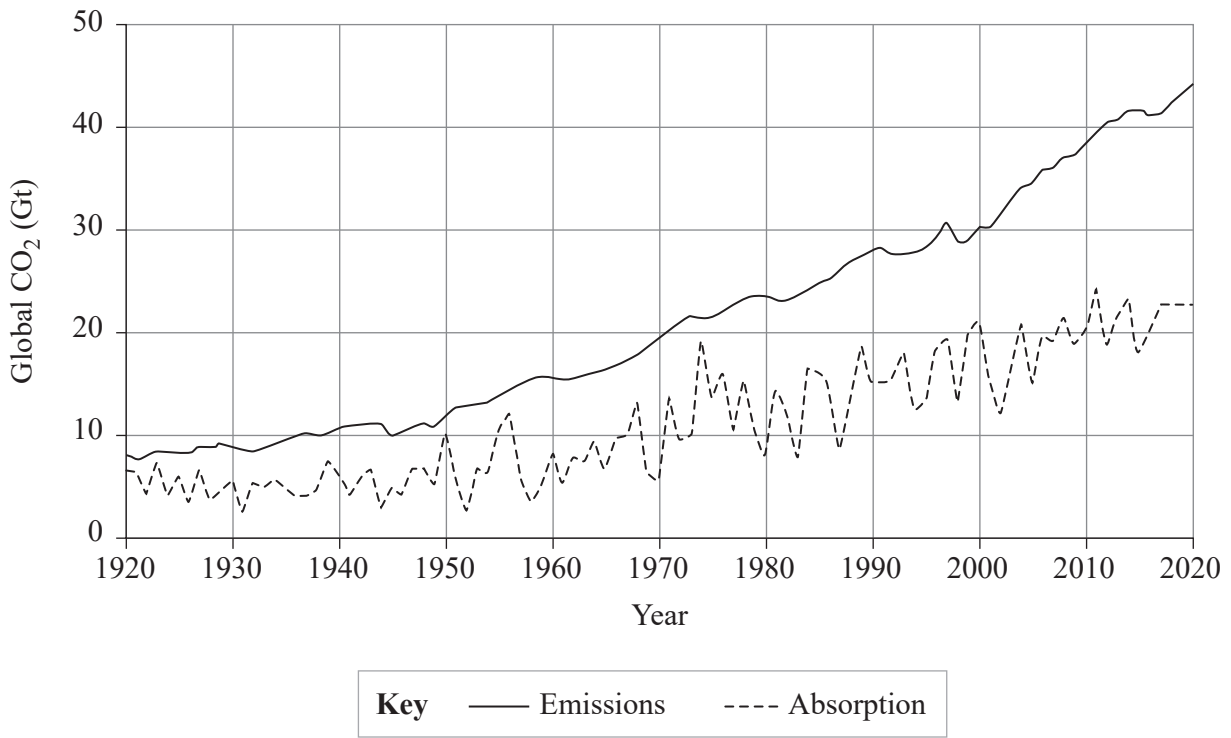
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**QUESTION 18 (6 marks)**

The graph shows the rate of carbon dioxide emissions and absorption between 1920 and 2020.



a) Explain the net effect of the trends in carbon dioxide emissions shown by the graph. [2 marks]

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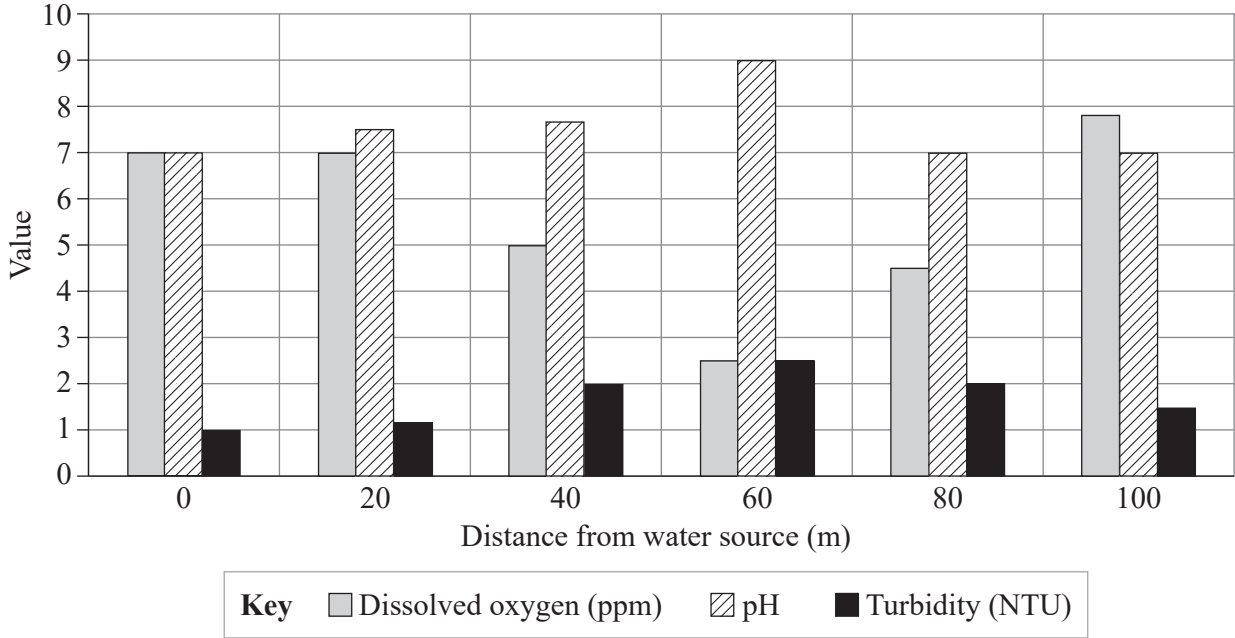
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### QUESTION 19 (5 marks)

A study was conducted when a sudden algal bloom was discovered in a waterway that runs adjacent to a dairy paddock. Fertiliser had been applied to the paddock several weeks before. Dissolved oxygen, pH and turbidity were measured at various distances from the source of the waterway.



Draw a conclusion about possible anthropogenic causes of the algal bloom. Show your reasoning, referring to each variable measured in the graph.

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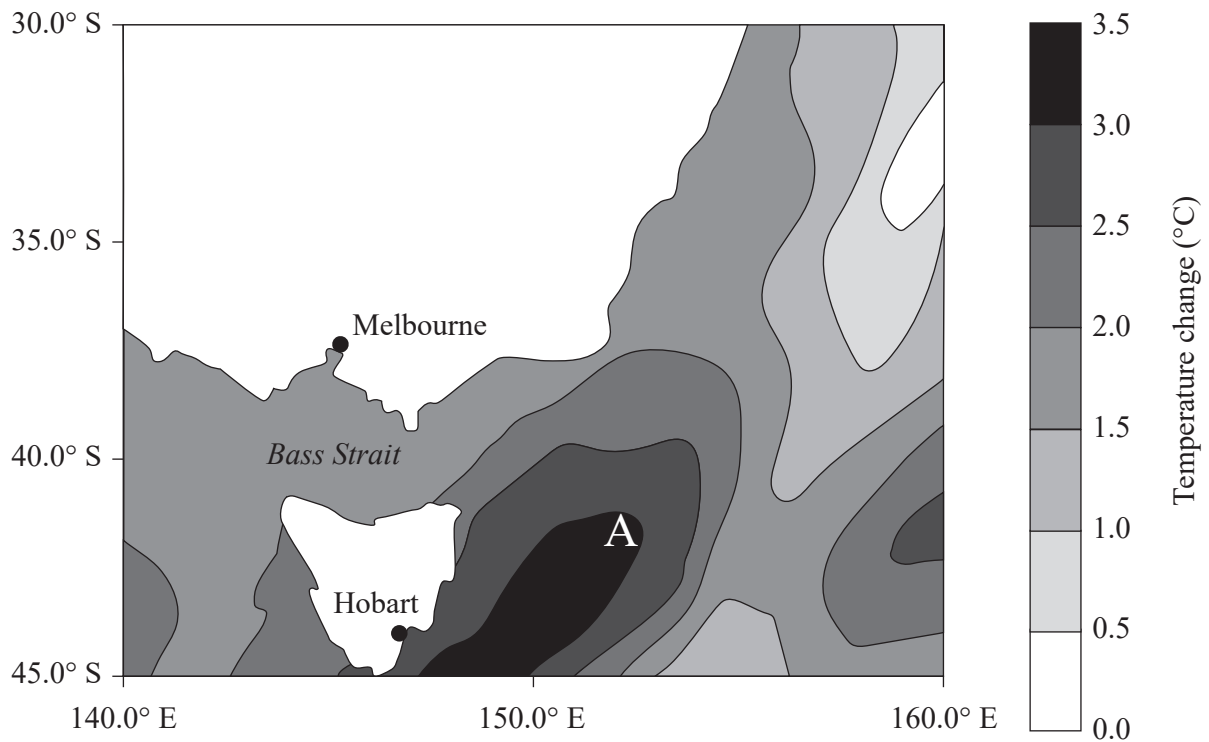
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**QUESTION 20 (5 marks)**

The map models changes in winter sea surface temperature from 2006 to 2100.



- a) Explain a likely change in fisheries distribution and sustainability in area A. [3 marks]

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b) Identify a mitigation strategy for the change identified in Question 20a) that could be implemented by the Australian government. *[1 mark]*

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c) Identify a mitigation strategy for the change identified in Question 20a) that could be implemented by local fisheries. *[1 mark]*

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**END OF PAPER**

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## References

### Question 16

Data derived and/or adapted from Raymond, O.L., Liu, S, Gallagher, R, Zhang, W, Highet, LM 2012, 'Surface Geology of Australia 1:1 million scale dataset 2012 edition', *Geoscience Australia*, Canberra. <https://dx.doi.org/10.26186/74619>. CC-BY 4.0

### Question 17

Adapted from Figure 1 in Nunn, PD, Kumar, L, Eliot, I et al. 2016, 'Classifying Pacific islands', *Geoscience Letters*, 3, 7, <https://doi.org/10.1186/s40562-016-0041-8>. Used under the Creative Commons Attribution 4.0 International Licence CC BY 4.0.

### Question 20

Model data derived from National Computational Infrastructure (NCI) ESGF Node, <https://esgf.nci.org.au/search/esgf-nci>.



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