

LUI

School code

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Book of books used

External assessment 2023

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 (20 marks)

- 20 multiple choice questions

Section 2 (34 marks)

- 4 short response questions





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Section 1

Instructions

- This section has 20 questions and is worth 20 marks.
- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.
- Choose the best answer for Questions 1–20.
- 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"/>

	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"/>
4.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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6.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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"/>
16.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ensure you have filled an answer bubble for each question.

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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 four questions and is worth 34 marks.
-

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QUESTION 21 (7 marks)

a) Describe the concept of an ecological footprint and state its unit of measure.

[2 marks]

b) Identify an example of a biological resource and four factors that would be considered when calculating its ecological footprint.

[5 marks]

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QUESTION 22 (9 marks)

a) Identify three steps involved in separating iron metal from iron ore.

[3 marks]

b) Explain the separation processes identified in Question 22a), referring to the properties of iron or iron ore.

[6 marks]

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QUESTION 23 (14 marks)

A business wants to install a renewable energy farm to partially offset its electricity consumption over the next 10 years. A summary of the two options is shown.

Form of renewable energy	Initial cost	Annual cost	Rate of energy production (kW)	Average working time (hours per day)
Solar	\$375 000	\$2500	125	12
Wind	\$465 000	\$3350	125	18.5

a) Determine the average annual cost (\$/year), annual energy production (kWh/year) and average energy cost (c/kWh) for

i) solar.

[3 marks]

ii) wind.

[3 marks]

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b) Justify a conclusion about the most cost-effective form of renewable energy for the business.

[2 marks]

c) Explain a technological, environmental and geographical factor that the business should consider when choosing a solar or wind farm.

[6 marks]

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QUESTION 24 (4 marks)

The first map shows distribution of *Aedes aegypti* mosquitoes in 1980 and 2020 for Australia. The second map shows the change in average annual rainfall between 1980 and 2020.

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a) Discuss whether the data supports the conclusion that there is a relationship between the distribution of *Aedes aegypti* mosquitoes and rainfall.

[3 marks]

b) Predict how the distribution of *Aedes aegypti* mosquitoes will change in the future if these trends continue.

[1 mark]

END OF PAPER

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ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

Do not write outside this box.

**ADDITIONAL PAGE FOR STUDENT RESPONSES**

Write the question number you are responding to.

Do not write outside this box.

References

Question 24

Russell, RC, Currie, BJ, Lindsay, MD, Mackenzie, JS, Ritchie, SA & Whelan, PI 2009, 'Dengue and climate change in Australia: predictions for the future should incorporate knowledge from the past', *The Medical Journal of Australia*, vol. 190, no. 5, pp. 265–268, <https://doi.org/10.5694/j.1326-5377.2009.tb02393.x>.



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