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School code

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School name

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Given name/s

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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 2021

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 (42 marks)

- 6 short response questions

Section 2 (11 marks)

- 1 extended response question



DO NOT WRITE ON THIS PAGE
THIS PAGE WILL NOT BE MARKED

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 six questions and is worth 42 marks.
-

QUESTION 1 (6 marks)

Describe each separation process and identify an ore used and the mineral extracted.

a) Milling

[3 marks]

b) Sluicing

[3 marks]

Do not write outside this box.

QUESTION 2 (4 marks)

Identify one way that coal mining can have an environmental impact on the biosphere and hydrosphere, and propose a method for monitoring each impact.

a) Biosphere

[2 marks]

b) Hydrosphere

[2 marks]

Do not write outside this box.

QUESTION 3 (6 marks)

Use Stimulus 1 in the stimulus book to draw a conclusion about the effectiveness of the sulfur dioxide management program. Justify your conclusion using three pieces of evidence. Identify two limitations in the data.

Do not write outside this box.

QUESTION 4 (6 marks)

Determine if the variables used in Stimulus 2 in the stimulus book are suitable for predicting volcanic eruptions. Justify your response with data from the stimulus.

Do not write outside this box.



Do not write outside this box.



QUESTION 5 (10 marks)

a) Use Stimulus 3 and 4 in the stimulus book to infer the impacts that changes in climatic conditions will have on crop productivity for Site A and Site B. Justify each inference with one piece of evidence from each stimulus.

[6 marks]

Do not write outside this box.

b) For each site, propose a strategy that could be used to protect or enhance agricultural production. Justify your proposals using data from the stimulus.

[4 marks]

Do not write outside this box.

QUESTION 6 (10 marks)

The diagram shows the results of a soil sampling geochemical exploration, giving gold concentrations in parts per million. The lines indicate the start of a river system.

	A	B	C	D	E	F	G	H	I	J	K	L
1	0.7	2.2	0.1	0.8	1.9	1.6	1.8	1.8	2.5	1.7	1.0	1.2
2	2.4	2.3	0.7	6.1	1.1	1.6	1.8	0.0	1.5	1.1	2.2	2.2
3	1.3	4.8	8.0	8.7	8.5	0.9	0.3	0.2	1.0	0.9	1.5	0.7
4	1.6	2.1	5.6	7.0	7.2	1.5	1.0	0.2	1.1	0.3	1.0	1.2
5	2.0	2.0	1.4	5.9	0.1	0.7	2.4	0.2	0.4	1.7	0.1	0.7
6	1.9	0.5	1.7	5.3	0.9	0.9	0.1	0.8	1.0	2.3	2.0	2.1
7	1.7	0.1	4.9	1.6	1.9	2.0	1.8	1.0	1.8	3.9	2.3	1.6
8	2.2	4.2	0.7	1.4	1.8	0.6	1.0	1.5	5.2	6.5	2.1	1.2
9	0.8	2.9	1.3	1.1	0.3	0.9	0.4	0.7	4.4	8.5	5.3	0.6
10	2.3	1.3	2.5	0.3	0.1	1.2	0.1	0.5	2.3	7.1	5.2	1.7
11	2.2	2.0	1.9	1.8	2.3	1.2	0.8	1.5	2.4	1.5	0.9	1.1
12	2.0	0.3	2.5	0.4	1.7	1.6	2.1	0.2	1.0	0.3	0.5	1.2

a) Annotate the diagram to complete the river system.

[1 mark]

Note: If you make a mistake in the diagram, cancel it by ruling a single diagonal line through your work and use the additional diagram on page 17 of this question and response book.

b) Use the diagram to propose a drill site for further gold exploration.

Provide two reasons to support the selected drill site.

[3 marks]

Do not write outside this box.

c) Before drilling commences, your chosen drill site is deemed unacceptable. Suggest why this could be the case. Propose an alternative drill site and provide two reasons to support the new site. *[4 marks]*

d) Explain why there are higher gold concentrations at C7 compared to H9–H11. *[2 marks]*

Do not write outside this box.

Section 2

Instructions

- Respond in 300–350 words.
 - This section has one question and is worth 11 marks.
-

QUESTION 7 (11 marks)

This question refers to Stimulus 5–8 in the stimulus book.

In January 2020, it was claimed that ‘management of the Namoi River catchment has had a negative impact on the availability and quality of fresh water in local ecosystems’.

Water restrictions for general use in towns in the catchment area were implemented in December 2019 to increase the availability and quality of fresh water for local ecosystems.

- a) Draw a conclusion about whether the catchment has been managed effectively.

Provide two reasons to support your conclusion.

[3 marks]

Do not write outside this box.

b) Discuss the claim made about the management of the catchment by using the stimulus to identify three possible causes and associated impacts on the local ecosystem. Propose and justify a solution to address the impacts.

[8 marks]

Do not write outside this box.

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.

ADDITIONAL RESPONSE SPACE FOR QUESTION 6

If you want this diagram to be marked, rule a single diagonal line through the diagram on page 8.

	A	B	C	D	E	F	G	H	I	J	K	L
1	0.7	2.2	0.1	0.8	1.9	1.6	1.8	1.8	2.5	1.7	1.0	1.2
2	2.4	2.3	0.7	6.1	1.1	1.6	1.8	0.0	1.5	1.1	2.2	2.2
3	1.3	4.8	8.0	8.7	8.5	0.9	0.3	0.2	1.0	0.9	1.5	0.7
4	1.6	2.1	5.6	7.0	7.2	1.5	1.0	0.2	1.1	0.3	1.0	1.2
5	2.0	2.0	1.4	5.9	0.1	0.7	2.4	0.2	0.4	1.7	0.1	0.7
6	1.9	0.5	1.7	5.3	0.9	0.9	0.1	0.8	1.0	2.3	2.0	2.1
7	1.7	0.1	4.9	1.6	1.9	2.0	1.8	1.0	1.8	3.9	2.3	1.6
8	2.2	4.2	0.7	1.4	1.8	0.6	1.0	1.5	5.2	6.5	2.1	1.2
9	0.8	2.9	1.3	1.1	0.3	0.9	0.4	0.7	4.4	8.5	5.3	0.6
10	2.3	1.3	2.5	0.3	0.1	1.2	0.1	0.5	2.3	7.1	5.2	1.7
11	2.2	2.0	1.9	1.8	2.3	1.2	0.8	1.5	2.4	1.5	0.9	1.1
12	2.0	0.3	2.5	0.4	1.7	1.6	2.1	0.2	1.0	0.3	0.5	1.2

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