LUI | | | | | | | | | | | School code | | | | |

School name

Given name/s

Family name

Attach your barcode ID label here

Book ☐ of ☐ books used

External assessment 2023

Question and response book

Agricultural 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 (27 marks)

- 7 short response questions

Clear zone — margin trimmed off after completion of assessment

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED

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:	●	○	○	○

	A	B	C	D
1.	○	○	○	○
2.	○	○	○	○
3.	○	○	○	○
4.	○	○	○	○
5.	○	○	○	○
6.	○	○	○	○
7.	○	○	○	○
8.	○	○	○	○
9.	○	○	○	○
10.	○	○	○	○
11.	○	○	○	○
12.	○	○	○	○
13.	○	○	○	○
14.	○	○	○	○
15.	○	○	○	○
16.	○	○	○	○
17.	○	○	○	○
18.	○	○	○	○
19.	○	○	○	○
20.	○	○	○	○

Ensure you have filled an answer bubble for each question.

Do not write outside this box.

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 seven questions and is worth 27 marks.

QUESTION 21 (4 marks)

Explain the post-harvest processes involved in getting a horticultural plant product of your choice from the farm to the shop.

Do not write outside this box.

QUESTION 22 (2 marks)

The table shows expected feed consumption per day and mass gained per day for an agricultural animal at various stages of growth.

Life stage	Mass of food eaten (kg)	Mass gained (kg)	Feed conversion ratio (FCR)
Yearling	6.3	1.1	5.7
Weaner	6.6	1.2	5.5
Adult	5.4	0.7	

a) Determine the FCR for adults. *[1 mark]*

b) Identify the trend between an animal's age and its FCR. *[1 mark]*

Do not write outside this box.

QUESTION 23 (8 marks)

The Varroa mite is a honeybee parasite that has a major impact on overseas honey and related enterprises, killing large populations of bees and weakening colonies. If uncontrolled, Varroa mite infestation in honeybee colonies severely impacts honey production, but can also affect a wide range of pollination-reliant crops.

a) Identify two management strategies that beekeepers or biosecurity officers could implement to restrict the movement of Varroa mite outside of an infested area. *[2 marks]*

b) Identify another pest associated with an agricultural animal of regional importance and explain its effect on this animal. *[2 marks]*

c) Describe two stages of the life cycle of the pest from Question 23b). *[2 marks]*

Do not write outside this box.

d) Identify the point in the life cycle of the pest from Question 23b) where it is most vulnerable and explain why. *[2 marks]*

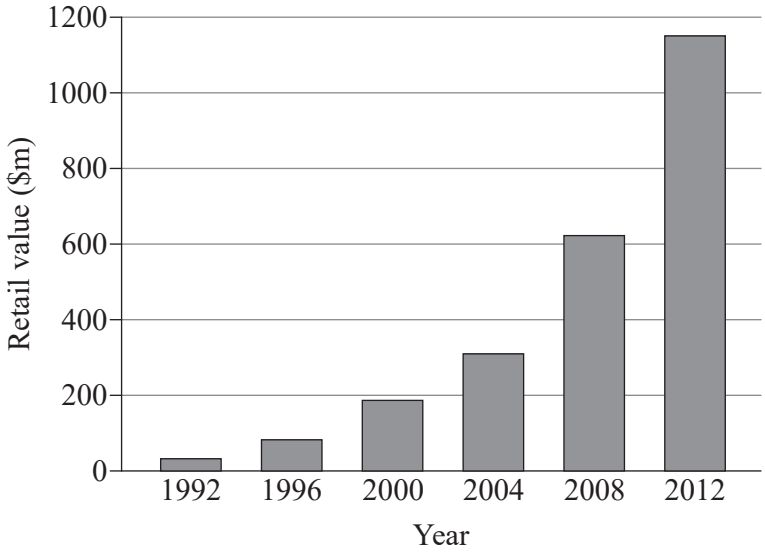
QUESTION 24 (3 marks)

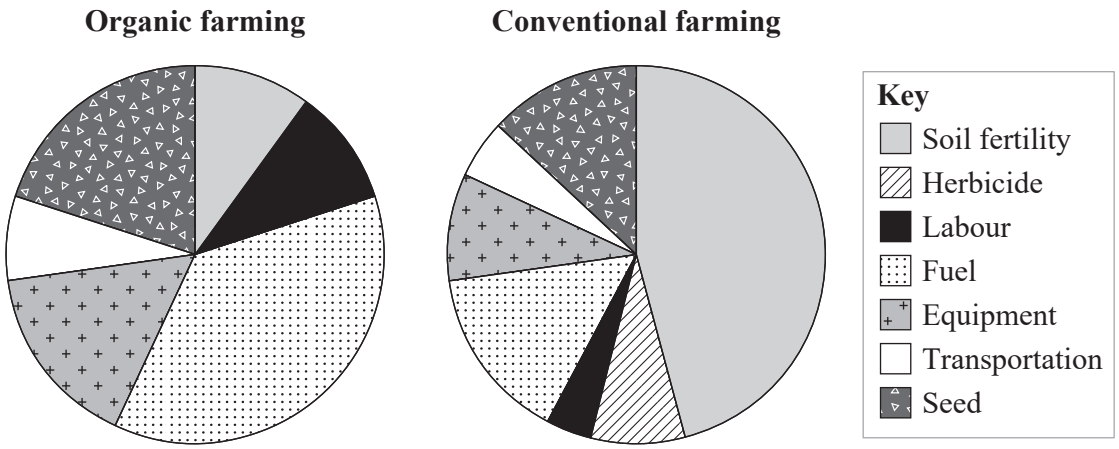
Explain how sowing rates and plant spacings differ between dryland and irrigated environmental conditions for a broadacre crop of your choice.

Do not write outside this box.

QUESTION 25 (4 marks)

The graphs show the change in retail value for organic production in Australia and the energy profiles (proportion of energy per activity) for organic farming compared to conventional farming.





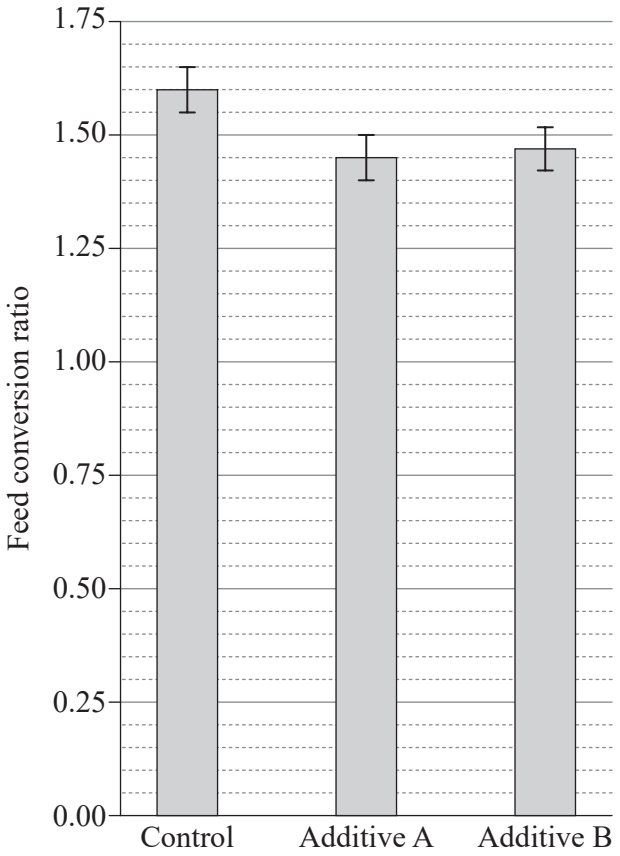
Do not write outside this box.

Draw two conclusions about the social sustainability of organic farming enterprises in Australia using the criteria of income and employment. Justify each conclusion using evidence from the graphs.

Do not write outside this box.

QUESTION 26 (3 marks)

An experiment was conducted to assess the effect food additives had on weight gain in layer chickens. The graph shows the feed conversion ratios for layer chickens fed two different additives compared to a commercial ration (the control).



Draw a conclusion about which feed type provides the optimal feed conversion for layer chickens. Use two pieces of evidence from the graph to support your conclusion.

Do not write outside this box.

Do not write outside this box.

QUESTION 27 (3 marks)

Aphids are a common pest in cereal crops. The table identifies different control methods.

Control method
Monitoring aphid population
Crop rotation
Preserving predators, e.g. ladybirds
Introducing enemies, e.g. parasitic wasps
Use of insecticides
Use of seed dressings

a) Identify which control methods are biological controls. *[1 mark]*

b) Explain two advantages of using biological controls. *[2 marks]*

END OF PAPER

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 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 25

Data adapted from Monk, A 2013, *Figure 1: Retail value growth 1990–2012* in 'Australian organic market reporting — Tracking horticultural organic growth, trends and markets', HAL, https://www.horticulture.com.au/globalassets/hort-innovation/historic-reports/australian-organic-market-reporting--tracking-horticultural-organic-growth-trends-and-markets-hg08080.pdf

Adapted from Fess, T, Benedito, V 2018, *Figure 7: Comparison of energy consumption in organic and conventional systems for annual crops* in 'Organic versus conventional cropping sustainability: A comparative system analysis', Faculty and Staff Scholarship, https://researchrepository.wvu.edu/faculty_publications/1219/