BOARD OF STUDIES
NEW SOUTH WALES

Centre Number

Student Number

2003

HIGHER SCHOOL CERTIFICATE EXAMINATION

Agriculture
Paper 1

General Instructions

- Reading time – 5 minutes
- Working time – 2 hours
- Write using black or blue pen
- Draw diagrams using pencil
- Board-approved calculators may be used
- Write your Centre Number and Student Number at the top of this page and page 5

Total marks – 70

Section I Pages 2–4

25 marks

- Attempt Questions 1–3
- Allow about 40 minutes for this section

Section II Pages 5–8

30 marks

- Attempt Questions 4–5
- Allow about 50 minutes for this section

Section III Pages 9–10

15 marks

- Attempt ONE question from Questions 6–9
- Allow about 30 minutes for this section

Section I

25 marks
Attempt Questions 1–3
Allow about 40 minutes for this section

Answer the questions in the spaces provided.

Marks

Question 1 (10 marks)

(a) Name ONE farm product you have studied.

Name of product .....

For the farm product you have named:

(i) Identify ONE measure of quality for the product. **1**

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(ii) Outline TWO ways a farmer can market this product. **2**

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(iii) Explain how an advance in technology has improved the quality or quantity of the product. **3**

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(b) Discuss ONE strategy a farmer could use to manage the problem of irregular income. **4**

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Marks

Question 2 (6 marks)

Glyphosate is a herbicide. The table shows the number of glyphosate-resistant annual ryegrass populations in different farming situations.

Situation	*Frequency of glyphosate (herbicide) use*	*Glyphosate-resistant ryegrass populations*
Orchard	very high	7
Minimum tillage grain cropping	high	4
Conventional grain cropping	moderate	2
Roadside	low	1

(a) Identify ONE conclusion that can be drawn from the information in the table. **1**

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(b) Explain how the use of herbicides, such as glyphosate, may lead to resistant ryegrass populations. **2**

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(c) Evaluate an alternative approach to the use of a single chemical which could slow the development of resistance. **3**

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Marks

Question 3 (9 marks)

An experiment was conducted on a potato crop to look at the effect of water on potato moth infection and total potato yield. The experiment investigated the effect of using the same total water, but delivered at three different irrigation intervals (days between irrigations). The results are shown in the table.

Irrigation intervals (days)	*Potato moth infection* (%)	*Yield of potatoes* (t/ha)
4	5.4	12.9
8	8.4	12.9
12	15.1	10.1

(a) Identify TWO conclusions that can be drawn from the experimental data in the table. **2**

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(b) Propose an irrigation interval to the potato farmer, and justify your proposal. **3**

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(c) Explain TWO procedures you would expect the researcher to carry out in designing this experiment, to ensure that the results are valid. **4**

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Section II

Student Number

30 marks
Attempt Questions 4–5
Allow about 50 minutes for this section

Answer the questions in the spaces provided.

Marks

Question 4 (15 marks)

(a) Outline the role of ONE hormone involved in animal behaviour. **2**

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(b) Describe, using an example, the effect of ONE environmental factor on the fertility of a farm animal. **3**

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(c) Explain how ONE management practice involved in farm animal reproduction increases production and financial returns to the farmer. **4**

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Question 4 continues on page 6

Marks

Question 4 (continued)

(d) Explain the role of hormone interactions in the regulation of the oestrus cycle in farm animals. **6**

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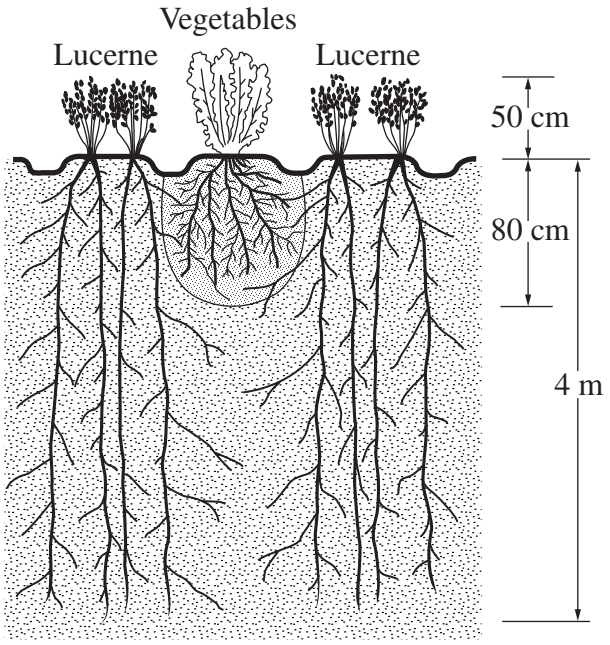
End of Question 4

Marks

Question 5 (15 marks)

Use the information below to answer parts (a) to (d).

The diagram shows how vegetables and lucerne (a legume) can be grown in alternate rows. This is known as alley cropping.



NOT TO SCALE

- Vegetables are regularly irrigated.
- Lucerne has very deep roots but few roots growing sideways.
- Various vegetable types are rotated over time in this vegetable system.

CSIRO, *Rural Research* 173, Summer 1996/97, Melbourne, page 21.

(a) Describe ONE way in which the vegetable and lucerne plants in this system may interfere with each other's growth. **2**

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(b) Explain ONE reason for rotating the types of vegetables grown over a period of years. **3**

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Question 5 continues on page 8

Question 5 (continued)

(c) Explain TWO benefits of growing vegetables by the use of a system like alley cropping. **4**

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(d) Discuss the economic and environmental sustainability of a system like alley cropping. **6**

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End of Question 5

Agriculture

Section III

15 marks
Attempt ONE question from Questions 6–9
Allow about 30 minutes for this section

Answer the question in a writing booklet. Extra writing booklets are available.

Marks

Question 6 (15 marks)

(a) Describe the conditions that must exist for disease to occur in a plant or animal. Use examples to illustrate your answer. **5**

(b) Describe an integrated pest management (IPM) program that you have studied and evaluate it in terms of: **10**

- its success;
- its effect on pesticide use;
- possible future developments.

OR

Question 7 (15 marks)

(a) Describe TWO farming practices and the environmental damage they have caused. Use examples to illustrate your answer. **5**

(b) Describe the ongoing tension between the use of water in agriculture and the need to protect and conserve waterways in Australia. **10**

Evaluate the ways in which this tension is being addressed by:

- farmers;
- the broader community;
- government.

OR

Please turn over

Marks

Question 8 (15 marks)

(a) Describe the stages of growth and development of a selected farm animal in terms of bone, muscle and fat from birth to maturity. **5**

(b) Describe a nutritional strategy that is used to meet a product specification for a particular farm animal. Evaluate this nutritional strategy in terms of: **10**

- success of goal achievement;
- costs involved;
- market price.

OR

Question 9 (15 marks)

(a) Describe a breeding system used to overcome a specific problem in a plant production system. **5**

(b) Describe THREE characteristics that have been bred into agricultural plants. Evaluate the impact of these characteristics in terms of: **10**

- plant production;
- environmental adaptability;
- product marketability.

End of paper