BOARD OF STUDIES
NEW SOUTH WALES

Centre Number

Student Number

2001

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 9

Total marks – 70

Section I Pages 2–7

25 marks

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

Section II Pages 9–12

30 marks

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

Section III Pages 13–14

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)

Name ONE farm product you have studied.

Name of product .....

Answer ALL parts of Question 1 with reference to the product named above.

(a) Identify ONE example of government intervention in the production or marketing of your named product. **1**

.....

.....

(b) Outline how the raw agricultural product is processed into another product that is sold to consumers. **2**

.....

.....

.....

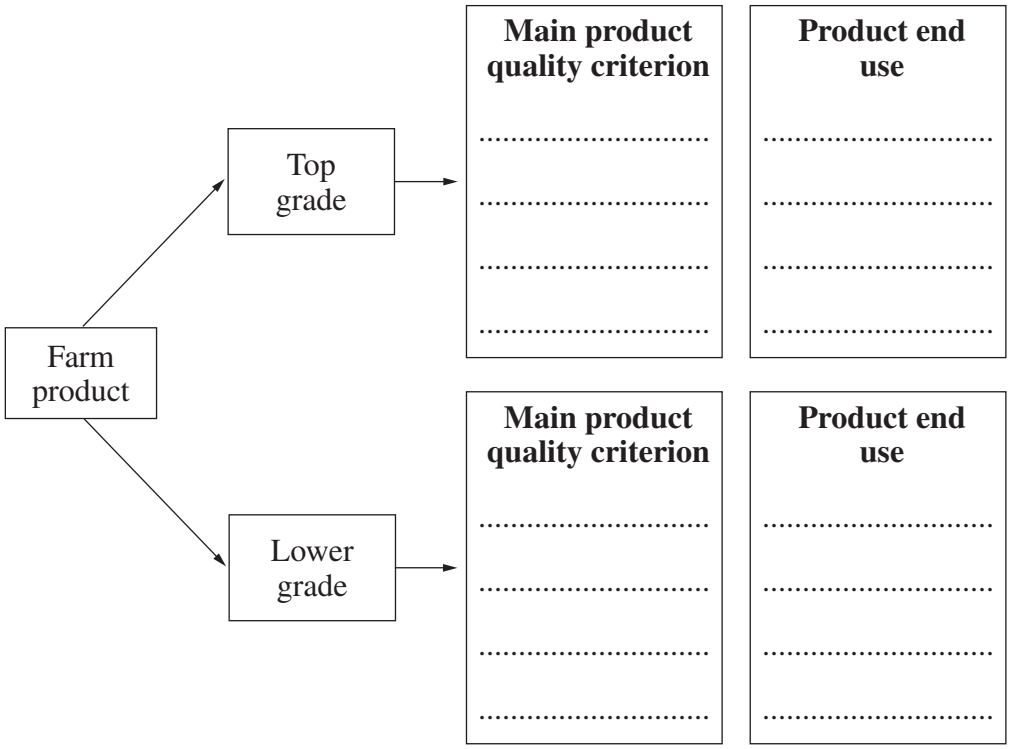
.....

Question 1 continues on page 3

Marks

Question 1 (continued)

(c) Farm products vary in their quality, and this affects their end use. For your named product, complete the diagram. **3**



(d) Explain how the marketplace or consumer may influence farmers to change their production techniques or products. **4**

.....

.....

.....

.....

.....

.....

.....

.....

End of Question 1

Marks

Question 2 (10 marks)

A new legume crop has been released that is suitable for growing in rotation with a variety of broadacre crops.

The table compares gross margins for the following two-year crop rotations:

- A: the new legume crop with crop *Y*
- B: a traditional two-year crop rotation of crop *X* with crop *Y*.

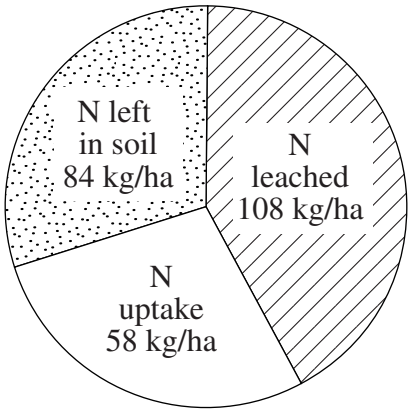
	GROSS MARGIN	
	Year 1	*Year 2*
Crop rotation A	New legume crop $340/ha	Crop *Y* $350/ha
Crop rotation B	Crop *X* $200/ha	Crop *Y* $290/ha

The total amount of plant-available soil nitrogen was initially similar for both crop rotations.

The graphs show the fate of plant-available soil nitrogen (N) for the two crop rotations at the end of the second year.

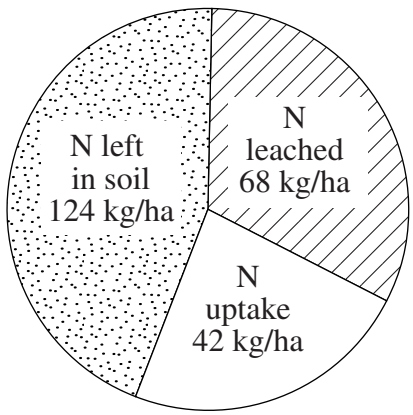
Crop rotation A

New legume/Crop *Y* rotation



Crop rotation B

Crop *X*/Crop *Y* rotation



(a) Which of the crop rotations has resulted in the greater financial gain? **1**

.....

Question 2 continues on page 5

Marks

Question 2 (continued)

(b) Which of the crop rotations would be most likely to have a negative environmental impact? Explain your answer. **2**

.....

.....

.....

.....

.....

(c) What part of the graph would the farm manager be most interested in when assessing what to grow in Year 3? Explain your answer. **2**

.....

.....

.....

.....

.....

(d) Evaluate the economic and physical or biological factors that a farm manager would need to consider when assessing the short-term profitability and the sustainability of these two rotations. **5**

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

End of Question 2

Question 3 (5 marks)

An experiment was conducted to determine the effect of giving grass-fed yearling cattle different additional feeds. The treatments compared were:

- no additional feeding (control)
- 5 kg/day lucerne hay
- 5 kg/day lucerne hay plus 0.5 kg/day cracked lupins
- 0.5 kg/day cracked lupins.

Each treatment was replicated four times.

The results of the experiment are shown in the table.

Growth rates (kg/animal/day) on feeding treatments

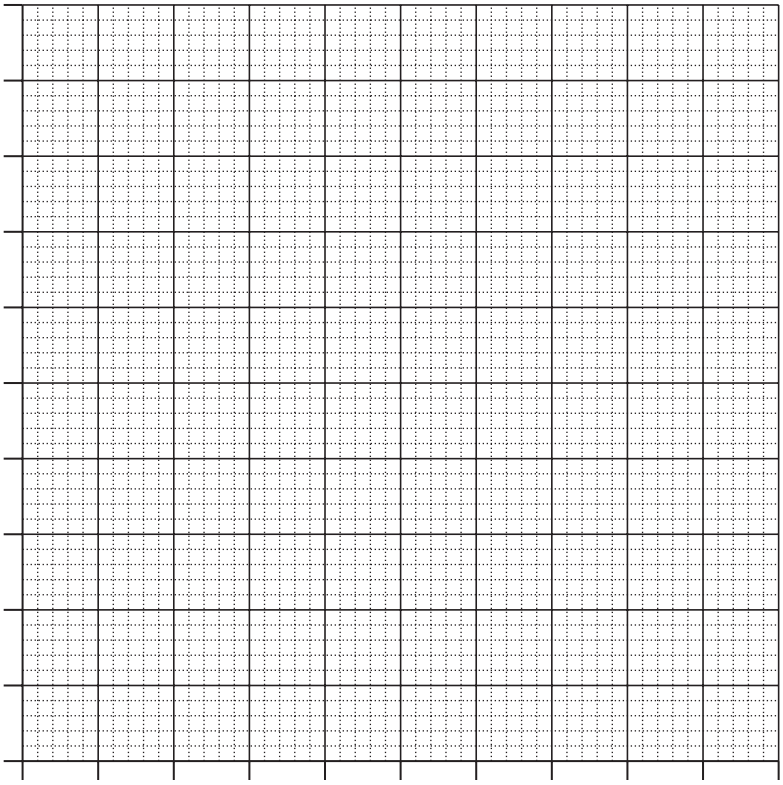
	Growth rates (kg/animal/day)				
	Replicates				
Treatments	*1*	*2*	*3*	*4*	*Mean*
Control	0.2	0.3	0.2	0.3	0.25
+ Lucerne	0.6	0.4	0.5	0.4	0.48
+ Lucerne + lupins	0.7	0.8	0.9	0.8	0.80
+ Lupins	0.4	0.6	0.4	0.5	0.48

Question 3 continues on page 7

Marks

Question 3 (continued)

(a) Using the grid, construct a graph showing the mean daily growth rate for the four treatments. **3**



(b) Discuss ONE factor that might influence the decision to use additional feeding in an animal production system. **2**

.....

.....

.....

.....

End of Question 3

BLANK PAGE

Agriculture

Centre Number

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 how ONE environmental factor affects plant production. **2**

.....

.....

.....

(b) Using ONE example you have studied, describe how an understanding of the interaction of genotype with the environment can be used to enhance plant productivity. **3**

.....

.....

.....

.....

.....

.....

Question 4 continues on page 10

Question 4 (continued)

(c) There has been an increasing emphasis on sustainability in Australian agriculture. **4**

Explain why current farming practices are more sustainable than past practices.

.....

.....

.....

.....

.....

.....

.....

.....

(d) Evaluate the use of native pasture species in sustainable pasture management systems. **6**

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

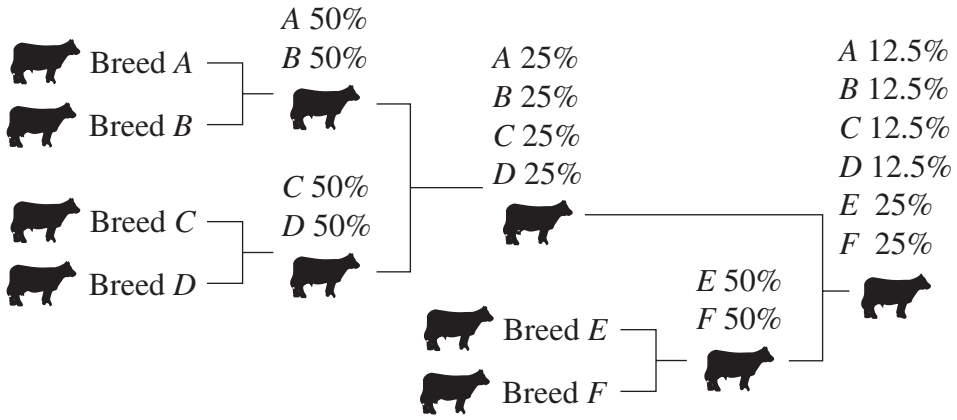
.....

End of Question 4

Marks

Question 5 (15 marks)

(a) The diagram shows a crossbreeding system involving six breeds of cattle.



(i) Describe the genetic basis of the crossbreeding system shown in the diagram. **2**

.....

.....

.....

.....

(ii) For an animal you have studied, outline a different breeding system that can be used to improve a particular characteristic or trait. Illustrate your answer with a diagram in the space below. **3**

.....

.....

.....

.....

Question 5 continues on page 12

Question 5 (continued)

(b) Animal diseases are the result of interactions between the problem organisms, the host and the environment. **4**

Explain, using examples, how these interactions can affect the use and potential for integrated pest management (IPM) of animal diseases.

.....

.....

.....

.....

.....

.....

.....

.....

(c) In animal production systems there are legal, ethical and welfare issues that need to be addressed. **6**

Evaluate management strategies that address each of these THREE issues.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

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) Through efficient management techniques, farmers attempt to control the various factors that limit the fertility of their animals. List these limiting factors, and for each factor describe a management technique that can be used to control it. **5**

(b) In order to maximise the output from an animal production system, it is essential for the farm manager to have a sound knowledge of the role of animal hormones. Select TWO hormones, and analyse how each acts to regulate both the reproduction and the behaviour of farm animals. **10**

OR

Question 7 (15 marks)

(a) Describe ONE piece of scientific research and associated technology that has influenced agricultural production or marketing. **5**

(b) Evaluate the positive and negative impacts of the use of the technology you described in part (a). **10**

OR

Please turn over

Marks

Question 8 (15 marks)

(a) Describe the role of minimum tillage and crop rotation in sustainable farming systems. **5**

(b) Evaluate the role of microbes and invertebrates in improving and/or maintaining soil fertility. **10**

OR

Question 9 (15 marks)

(a) Describe TWO mechanisms of interference in plant communities. **5**

(b) Evaluate how farmers may use plant interference to their benefit. Illustrate your answer with THREE examples. **10**

End of paper