2001 HSC Notes from the Examination Centre Agriculture

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GPO Box 5300
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Tel: (02) 9367 8111

Fax: (02) 9367 8484

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2001 HSC NOTES FROM THE EXAMINATION CENTRE AGRICULTURE

Introduction

This document has been produced for the teachers and candidates of the Stage 6 course Agriculture. It provides comments with regard to responses to the 2001 Higher School Certificate Examination, indicating the quality of candidate responses, and highlighting the relative strengths and weaknesses of the candidature in each section and each question.

It is essential for this document to be read in conjunction with the relevant syllabus, the 2001 Higher School Certificate Examination, the Marking Guidelines, and other support documents, which have been developed by the Board of Studies to assist in the teaching and learning of Agriculture.

The marking guidelines, developed by the Examination Committee at the time of setting the Higher School Certificate Examination and used at the marking centre, are also available on the Board of Studies website.

The total number of candidates presenting for Agriculture in 2001 was 1513, of which 117 elected to undertake the Optional Research Project instead of sitting for Paper 2.

The 2001 Higher School Certificate examination paper in Agriculture examined a range of syllabus outcomes. The variety of question types and styles catered for the full range of candidates. The paper provided adequate access to lower ability candidates and challenged and extended the more capable candidates.

In general, candidates demonstrated skills in and knowledge of an adequate range of syllabus outcomes. They showed sound knowledge and understanding of the production and marketing of animal and plant products, the interaction between the component parts of agriculture and the scientific principles that explain key agricultural processes.

Paper 1

Section I

General Comments

Overall, candidates performed quite well in this section. Most candidates showed a sound and thorough understanding of their chosen farm product, and were able to interpret and manipulate data from tables and graphs.

In this section there was an adequate interpretation by most candidates of the key words in questions. However, some candidates had difficulty in differentiating between ‘describe’, and ‘explain’, while others had difficulty in providing an appropriate response when asked to ‘evaluate’.

Specific Comments

Question 1

This question examined various aspects of a Farm Product Study and was generally well answered.

(a) Most candidates correctly identified an example of a government intervention. A minority of candidates simply named a government department or organisation, for example, the NSW Dairy Corporation, but did not indicate its role in the production or marketing process.

(b) This part was well answered with reference to the named product. Candidates who did not gain full marks generally provided only a token number of steps in the processing of the raw product into its saleable form for consumers.

(c) Overall this part was answered quite poorly. Many candidates failed to sufficiently differentiate between 'top' and 'lower' grade. In addition, many were too general in their description of the quality criteria, stating factors such as protein content, butterfat levels and cell counts in milk without being specific about actual values for the criteria required to place a product in the designated grade.

(d) This part was answered well by the better candidates who successfully linked a change in consumer demand/preference to the changes required by the producer to meet this demand.

Question 2

(a) The majority of candidates were able to interpret the gross margins to identify crop rotation A as having the greater financial gain. A significant number of candidates showed a poor understanding of gross margins. Many misunderstood the values to be the costs incurred in crop establishment.

(b) The majority of candidates correctly identified Crop A as being more likely to have negative environmental effects. Most candidates also related this to either the excessive nitrogen leached or the low nitrogen level left in the soil. A small proportion of responses then successfully linked these features to their effect on the environment.

(c) A significant number of candidates experienced difficulty with this question. Instead of naming one part of the graph as required, they named several. Many could not relate 'N left in soil' to crop selection for the third year.

(d) Nearly all candidates were able to name factors that need to be considered. Poorer responses simply listed several of these or stated them in the form of a question such as 'How much does it cost?' Most candidates were able to make a satisfactory evaluation of either economic or physical/biological factors. Poorer responses made vague, general comments about short-term gain versus sustainability and did not link back to the two crop rotations in question.

Question 3

(a) This question was generally poorly answered. Most candidates selected the appropriate graphical form, a bar graph. Often, however, axes were poorly labelled and displayed inadequate information, for example, units were omitted. Many candidates did not plot points

accurately onto their graphs. Candidates often failed to use a correct scale. Some candidates drew line graphs or a series of unconnected plot points.

(b) The majority of candidates managed to identify one factor that could influence the decision to use additional feeding. The better candidates then indicated **how** this factor could influence the decision to provide additional feed.

Section II

General Comments

This Section examined the Plant/Animal Production content of the syllabus. Overall, candidates' responses to this section were disappointing.

Specific Comments

Question 4

(a) The vast majority of candidates was able to state one environmental factor. Only the better candidates were able to link this factor to its effect on plant production.

(b) Most candidates showed a good understanding of the interaction between genotype and the environment.

(c) Better candidates scored well on this part as they used specific examples to make the relationship between past and current farming practices evident in terms of sustainability.

(d) Well-prepared candidates were able to make judgements about the use of native pastures based on criteria such as drought tolerance and low water usage.

Question 5

(a) (i) Many candidates were unable to interpret the stimulus material used in this question. Better candidates were able to describe the genetic basis of the cross-breeding illustrated.

(ii) Few candidates were able to illustrate adequately an alternative breeding system.

(b) Many candidates showed that they had a good understanding of IPM. However, only the most well-prepared were able to use examples from an animal disease, to show the effect of interactions between the host, environment, and the problem organism.

(c) While most candidates were able to name legal, welfare and ethical issues, only the best candidates were able to evaluate management strategies that addressed the three issues.

Section III

Specific Comments

Question 6

20% of candidates attempted this extended free-response question.

(a) Almost all candidates were able to list factors limiting the fertility of animals. The majority of candidates was able to describe the characteristics/features of management techniques used to control the factors listed. Many candidates described how the factor was limiting, rather than describing a technique to control it.

(b) The majority of candidates was able to name two hormones. Most were able to identify the reproductive functions of female hormones, however identification of behavioural responses was limited or absent. Identification of male hormones was often followed by a discussion of behavioural effects only. Few candidates could actually draw out implications of two hormones, let alone for both behaviour and regulation of reproduction. Many candidates described management techniques to manipulate hormones eg MOET and AI, which does not have hormonal implications.

Question 7

40% of candidates attempted this question.

(a) Most candidates were able to state or provide features of a piece of research or technology, but few made clear links to production or marketing.

(b) Most candidates explained impacts and showed a good understanding by including accurate 'cause and effect' statements. However, many simply listed impacts, and very few candidates provided an evaluation of the impacts.

Question 8

32% of candidates attempted this question.

(a) Most candidates showed that they had a good understanding of the role of minimum tillage and crop rotation in sustainable farming systems.

(b) Many candidates were able to describe the role of microbes and invertebrates in soil fertility. Better responses made sound judgements based on criteria about the role of microbes and invertebrates in soil fertility.

Question 9

8% of candidates attempted this question.

(a) This part was poorly answered. Better responses provided the features of two types of plant interference. Many candidates provided examples without an adequate description of features. Many candidates could not define interference nor could they describe two examples.

(b) Most candidates managed to provide broad details of plant interference beneficial to farmers, but did not go into any detail. In general, candidates did not provide three examples, nor could they relate the examples they did identify, to beneficial use by farmers. The poorest responses confused plant interference and soil conservation practices.

Paper 2

General Comments

Candidates were required to attempt two out of the six elective questions in this section. In general, well prepared candidates showed a sound and thorough understanding of the electives.

Many candidates had a poor understanding of research methodology and presentation of research.

Specific Comments

Question 1 – Agribusiness

Approximately 8% of candidates attempted this question.

(a) Most candidates were able to describe techniques for determining the financial status of the farm. Many, however, did not name specific techniques and confused the farm's 'financial status' with its assets/land value.

(b) Most candidates were able to suggest suitable financing options for the tractor and the fertiliser as well as to identify why they were suitable. Some candidates inappropriately selected the same option for both.

(c) Few candidates identified an appropriate study. Those that did refer to a study did not adequately analyse the appropriateness of the methodology involved, nor did they analyse the way data were collected, presented and interpreted.

Question 2 – Animal Management

Approximately 79% of candidates attempted this elective question.

(a) Most candidates were able to identify techniques producers use to manipulate the rates of animal growth and development. Many responses failed to describe these using appropriate examples.

(b) This part was well answered with most candidates demonstrating a good understanding of what vaccination is and how it works.

(c) Few candidates were able to present an adequate analysis of a 'study' of a current technique/ technology. Many simply discussed current techniques without reference to a study or piece of research. Those that did refer to a study, rarely analysed the appropriateness of the methodology involved and simply described the experimental design.

Question 3 – Horticulture

Approximately 9% of candidates attempted this question.

(a) This part was generally well answered. A few candidates had difficulty identifying an appropriate horticultural plant and inappropriately used broadacre crops as an example.

(b) Most candidates could identify a strategy to improve economic viability or sustainability. Few explained how both could be improved.

(c) Most candidates were unable to identify a study. Those that did, offered a limited description. Very few analysed any aspect of the appropriateness of methodology used.

Question 4 – Innovation and Diversification

Approximately 15% of candidates attempted this question.

(a) Most candidates could provide characteristics and features of two marketing techniques.

(b) Most candidates could identify a strategy to improve economic viability or sustainability. Few explained how both could be improved.

(c) Most candidates were unable to identify a study. Those that did, offered a limited description. Very few candidates analysed any aspect of the appropriateness of methodology used.

Question 5 – Plant Management

Approximately 24% of candidates attempted this question.

(a) Most candidates were able to name two plant hormones and provide features of the action of each.

(b) Most candidates were able to explain how the cellular anatomy of two structures relates to their function. Some candidates incorrectly explained the relationship of organ structure rather than cellular structure.

(c) The majority of candidates were able to name a study involving research aimed at improving plant productivity. Most simply discussed the role of an area of research rather than analysing research methodology of a particular trial. Highest scoring candidates described a trial and analysed the appropriateness of the methodology used, including data collection, presentation and interpretation.

Question 6 – Sustainable Land and Resource Management

Approximately 65% of candidates attempted this question.

(a) This question was answered poorly by a majority of candidates. Although most were able to describe features of land that may require specific farming and conservation practices, few referred to specific land classification systems. Better candidates were able to demonstrate an

understanding of a particular land classification system, its classes and appropriate farming practices to ensure sustainability in a district or region of Australia.

(b) This question was well answered by the majority of candidates. Better candidates clearly related cause and effect for both dryland and irrigation salinity.

(c) Most candidates were not familiar with an appropriate study involving research of technologies or practices that assist with the conservation and efficient use of water. High scoring candidates were able to describe a suitable piece of research and could draw out and relate the implications associated with the research methodology, data collection, presentation and interpretation.

Optional Research Project

Approximately 8% (117 candidates) of the 2001 HSC Agriculture candidature submitted a research project in lieu of studying two elective topics and attempting Paper 2.

A wide range of research topics was presented and both quantitative and qualitative research methodologies were represented.

Projects that gained high marks were characterised by:

- the selection of a relevant agricultural problem
- the use of appropriate experimental design, data collection and data analysis
- issues relating to welfare and ethics in research being appropriately addressed
- being well structured, within the 3000-5000 word limit and presented cohesively
- the inclusion of a properly referenced, concise and relevant literature review which focused directly on previous research associated with the research question
- appropriate conclusions drawn from the data collected and meaningful recommendations emanating from the research presented
- the inclusion of a precise synopsis of the research and an accurate bibliography.

Low-scoring projects often did not articulate a clearly defined research question that was relevant to modern Agriculture. In these projects, often the research methodology, data collection techniques and data analysis contained serious flaws.

The literature review in many projects failed to provide the reader with an overview of the current knowledge about the research topic. Many did not refer to previous research. They presented a poor assembly of facts and summaries from textbooks, rather than the integrated, relevant review required.

Many projects made no reference to ethical and welfare concerns. *Board Bulletin* Volume 9 No 8 November 2000 clarifies this requirement.

A significant number of candidates took the opportunity to investigate data from another researcher or from a previously published work. While this is acceptable, many candidates were unable to display any depth of understanding of the research undertaken, the data collected or of the statistical analysis applied.

In general, candidates who scored the highest marks related their research to an agricultural problem that was relevant to them. They posed a realistic, achievable and specific research question and then undertook suitable research methods and used appropriate data analysis to answer that question. Their research report was well presented and concise, falling within the 3000-5000 word limit. In the best reports no superfluous information was submitted. These candidates focused their attention on answering directly the question that they had posed.

Agriculture

2001 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
Paper 1			
1 (a)	1	Farm Product Study – government intervention	H3.3
1 (b)	2	Farm Product Study – processing of raw commodity	H3.3
1 (c)	3	Farm Product Study – quality criteria	H3.1, H3.2
1 (d)	4	Farm Product Study – performance of systems and decision-making based on quality/quantity	H3.2, H3.3, H3.4
2 (a)	1	Plant/Animal Production – analyse and interpret ag data	H1.1, H4.1
2 (b)	2	Plant/Animal Production – recommendations based on interpretation of results	H1.1, H4.1
2 (c)	2	Plant/Animal Production – recommendations based on interpretation of results	H1.1, H4.1
2 (d)	5	Plant/Animal Production – tension between sustainability and short-term profit	H1.1, H3.4
3 (a)	3	Plant/Animal Production – analyse and interpret ag data	H4.1
3 (b)	2	Plant/Animal Production – make recommendations based on experiments	H3.1, H3.4
4 (a)	2	Plant/Animal Production – environmental constraints	H2.1
4 (b)	3	Plant/Animal Production – interaction of genotype with environment	H2.1
4 (c)	4	Plant/Animal Production – historical development of ag	H1.1
4 (d)	6	Plant/Animal Production – native versus introduced pastures	H1.1 H2.1
5 (a) (i)	2	Plant/Animal Production – breeding systems and genetic basis	H2.2
5 (a) (ii)	3	Plant/Animal Production – breeding systems and genetic basis	H2.2
5 (b)	4	Plant/Animal Production – interaction of problem organisms/host/environment	H1.1, H2.2
5 (c)	6	Plant/Animal Production – ethics, welfare and legal issues	H2.2
6 (a)	5	Plant/Animal Production – factors limiting fertility	H1.1, H 2.2
6 (b)	10	Plant/Animal Production – hormones regulating reproduction and behaviour	H1.1, H2.2
7 (a)	5	Plant/Animal Production – scientific research and associated technology	H3.3
7 (b)	10	Plant/Animal Production – scientific research and associated technology	H3.3
8 (a)	5	Plant/Animal Production – sustainable farming practices	H1.1
8 (b)	10	Plant/Animal Production – role of microbes and invertebrates	H1.1
9 (a)	5	Plant/Animal Production – components of plant interference	H2.1
9 (b)	10	Plant/Animal Production – components of plant interference	H2.1

Agriculture

Question	Marks	Content	Syllabus outcomes
Paper 2			
1 (a)	3	Agribusiness – financial situation of farm	H3.4
1 (b)	4	Agribusiness – obtaining finance	H3.4
1 (c)	8	Agribusiness – research methodology of a study	H4.1
2 (a)	3	Animal Management – management techniques	H3.4
2 (b)	4	Animal management – nature of immune system	H3.4
2 (c)	8	Animal management – research methodology of a study	H4.1
3 (a)	3	Horticulture – characteristics of plants	H3.4
3 (b)	4	Horticulture – managing horticultural systems	H3.4
3 (c)	8	Horticulture – research methodology of a study	H4.1
4 (a)	3	Innovation & Diversification – marketing techniques	H3.4
4 (b)	4	Innovation & Diversification – management of alternative production systems or techniques	H3.4
4 (c)	8	Innovation & Diversification – research methodology of a study	H4.1
5 (a)	3	Plant Management – role of plant hormones	H3.4
5 (b)	4	Plant Management – function of main organs	H3.4
5 (c)	8	Plant Management – research methodology of a study	H4.1
6 (a)	3	Sustainable Land and Resource Management – land capabilities system	H3.4
6 (b)	4	Sustainable Land and Resource Management – dry land and irrigation salinity	H3.4
6 (c)	8	Sustainable Land and Resource Management – methodology of a study	H4.1
Optional Research Project			
	30	Research Project	H3.4, H4.1, H5.1

BOARD OF STUDIES
NEW SOUTH WALES

2001 HSC Agriculture
Marking Guidelines

Written Paper — Agriculture Paper 1

Section I

Question 1 (a) (1 mark)

Outcomes assessed: H3.3

MARKING GUIDELINES

Criteria	Marks
• States one example of government intervention in the production or marketing of the named product	1

Question 1 (b) (2 marks)

Outcomes assessed: H3.3

MARKING GUIDELINES

Criteria	Marks
• Names the raw material and final product • Lists the major steps in the process	2
• Names the raw materials and the final product • Lists some steps in the process	1

Question 1 (c) (3 marks)

Outcomes assessed: H3.1, H3.2

MARKING GUIDELINES

Criteria	Marks
• Correct responses are given in each of the four boxes by linking appropriate product quality criteria with end uses for both grades	3
• Correct responses are given in any three boxes	2
• Correct responses are given in any two boxes	1

Question 1 (d) (4 marks)

Outcomes assessed: H3.2, H3.3, H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies at least two changes in consumer demand related to an agricultural product • Outlines how farmers may meet each of these changes in demand OR • Identifies one change in consumer demand related to an agricultural product • Identifies a reason why this change in consumer demand has arisen • Outlines how farmers may meet the change in demand	4
• Identifies at least two changes in consumer demand related to an agricultural product • Outlines how farmers may meet one of these changes in demand OR • Identifies a reason why this change in consumer demand has arisen	3
• Identifies one change in consumer demand related to an agricultural product • Outlines how farmers may meet this change in demand	2
• Identifies one change in consumer demand OR • Identifies one way for farmers to meet a change in demand without identifying the change	1

Question 2 (a) (1 mark)

Outcomes assessed: H1.1, H4.1

MARKING GUIDELINES

Criteria	Marks
• Identifies correct rotation — rotation A	1

Question 2 (b) (2 marks)

Outcomes assessed: H1.1, H4.1

MARKING GUIDELINES

Criteria	Marks
• Identifies crop rotation A • Links nitrogen leaching with its impact on soil and the environment OR • Identifies crop rotation A • Links the residual N level in a soil with its impact on soil fertility	2
• Identifies crop rotation A AND EITHER • States that this rotation causes more nitrogen leaching OR • States that this rotation leaves a lower nitrogen residual in the soil	1

Question 2 (c) (2 marks)

Outcomes assessed: H1.1, H4.1

MARKING GUIDELINES

Criteria	Marks
• Identifies nitrogen left in the soil and relates this to plants' requirements for growth	2
• Identifies nitrogen left in the soil	1

Question 2 (d) (5 marks)

Outcomes assessed: H1.1, H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies one economic factor and one physical or biological factor that may impact on the short-term profitability and sustainability of the two rotations • Makes a judgement about each of the factors in terms of the tension between short-term profitability and sustainability	4–5
• Identifies one economic factor and one physical or biological factor that may impact on the short-term profitability and sustainability of the two rotations • Makes a judgement about one of the factors in terms of the tension between short-term profitability and sustainability	2–3
• Names one factor that has a bearing on profitability or sustainability	1

Question 3 (a) (3 marks)

Outcomes assessed: H 4.1

MARKING GUIDELINES

Criteria	Marks
• Correct graph including: (a) correct axes, (b) appropriate scale of axes, (c) correct labelling of axes (including treatments, growth rates and numerical values) and (d) means correctly plotted, (e) a histogram/column graph	3
• One omission or mistake in (a) – (e)	2
• Two omissions or mistakes in (a) – (e)	1

Question 3 (b) (2 marks)

Outcomes assessed: H3.1, H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies one factor that may influence the decision to use additional feeding • Indicates how the factor may influence this decision	2
• Identifies one factor that may influence the decision	1

Section II

Question 4 (a) (2 marks)

Outcomes assessed: H2.1

MARKING GUIDELINES

Criteria	Marks
• Names one environmental factor and links it with a positive or negative effect on plant production	2
• Names one environmental factor	1

Question 4 (b) (3 marks)

Outcomes assessed: H2.1

MARKING GUIDELINES

Criteria	Marks
• Using an example provides relevant characteristics and features of the interaction of genotype with the environment to show how plant productivity can be enhanced	3
• Using an example provides some characteristics and features of the interaction of genotype with the environment to show how plant productivity can be enhanced	2
• States that plant requirements vary from one species to the next OR • Indicates that plant requirements need to be provided by the environment	1

Question 4 (c) (4 marks)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Names at least two current farming practices and provides specific reasons for why and/or how current farming practices are more sustainable than past practices	4
• Names at least two current farming practices and provides some reasons for why and/or how current farming practices are more sustainable than past practices	3
• Names at least one current farming practice and provides specific reasons for why and/or how current farming practices are more sustainable than past practices OR • Names at least two current practices along with practices that they have replaced	2
• Names only one or two current farming practices that are more sustainable than past practices	1

Question 4 (d) (6 marks)

Outcomes assessed: H1.1, H2.1

MARKING GUIDELINES

Criteria	Marks
• With reference to specific criteria (reasons for and against), determines the value of the use of native pasture species in sustainable pasture management systems	5–6
• With reference to some criteria, determines the value of the use of native pasture species in sustainable pasture management systems	3–4
• Identifies at least one criterion as to why native pastures are used in sustainable pasture management systems	1–2

Question 5 (a) (i) (2 marks)

Outcomes assessed: H2.2

MARKING GUIDELINES

Criteria	Marks
• Provides characteristics and features of the genetic basis of the crossbreeding system	2
• Lists some general features of the genetic basis of the crossbreeding system	1

Question 5 (a) (ii) (3 marks)

Outcomes assessed: H2.2

MARKING GUIDELINES

Criteria	Marks
• With reference to an animal and using a clearly set out diagram, indicates the main features of a different breeding system that can be used to improve a particular characteristic or trait	3
• With reference to an animal and using a clearly set out diagram, indicates some features of a breeding system that can be used to improve a particular characteristic or trait OR • With reference to an animal and using a sketchy diagram, indicates the main features of a different breeding system than can be used to improve a particular characteristic or trait	2
• Mentions breeding systems and/or provides a diagram that is inaccurate and/or incomplete	1

Question 5 (b) (4 marks)

Outcomes assessed: H1.1, H2.2

MARKING GUIDELINES

Criteria	Marks
• Using at least two examples, provides relevant reasons for why and/or how the interactions between the problem organism, the host and the environment can affect the use and potential for IPM of animal diseases	4
• Using at least two examples, provides some reasons for why and/or how the interactions between the problem organism, the host and the environment can affect the use and potential for IPM of animal diseases	3
• Uses at least two examples but does not clearly relate the reasons for why interactions can affect the use and potential of IPM OR • Using at least one example, provides relevant reasons for why and/or how the interactions can affect the use and potential for IPM of animal diseases	2
• Mentions an example/s, but does not make the relationship between the interactions of factors and use and potential of IPM evident	1

Question 5 (c) (6 marks)

Outcomes assessed: H2.2

MARKING GUIDELINES

Criteria	Marks
• Names at least one management strategy for each of the three issues • Makes a judgement based on criteria about the value of each management strategy in addressing each of the three issues	5–6
• Names at least one management strategy for each of the three issues • Makes a general comment based on some criteria about the value of each management strategy in addressing each of the three issues OR • Names at least one management strategy for two of the issues • Makes a judgement based on criteria about the value of each management strategy in addressing each of the two issues	3–4
• Names a management strategy for at least two issues but does not determine the values of the strategy	1–2

Section III

Question 6 (a) (5 marks)

Outcomes assessed: H1.1, H2.2

MARKING GUIDELINES

Criteria	Marks
• Lists at least two factors that limit fertility • For each factor, provides characteristics/features of an appropriate management technique that attempts to control the limiting factor	4–5
• Lists two limiting factors and names appropriate management techniques that attempt to control these limiting factors	2–3
• Lists limiting factors	1

Question 6 (b) (10 marks)

Outcomes assessed: H1.1, H2.2

MARKING GUIDELINES

Criteria	Marks
• Names two hormones • Draws out and relates implications of each hormone on the reproduction and behaviour of the animal	9–10
• Names two hormones • Draws out and relates implications of one hormone on the reproduction and behaviour of the animal AND draws out and relates implications of the other hormone on reproduction OR behaviour	7–8
• Names two hormones • Outlines how each hormone can affect the animal's reproduction and behaviour OR • Names one hormone • Draws out and relates implications of the hormone on the reproduction and behaviour of the animal	5–6
• Names two hormones • Outlines how the hormone can affect the animal's reproduction or behaviour OR • Names one hormone • Outlines how the hormone can affect the animal's reproduction and behaviour	3–4
• Names one hormone • States the effect of the hormone on the animal	1–2

Question 7 (a) (5 marks)

Outcomes assessed: H3.3

MARKING GUIDELINES

Criteria	Marks
• Provides characteristics/features of one piece of scientific research and associated technology • Links this research and technology to production or marketing	4–5
• States the piece of research and technology, loosely linking it with the influence it has had on agricultural production or marketing OR • Provides characteristics/features of the piece of research and technology only	2–3
• States a piece of research and technology	1

Question 7 (b) (10 marks)

Outcomes assessed: H3.3

MARKING GUIDELINES

Criteria	Marks
• Provides a logical and accurate judgement (citing several examples) of both the positive and negative impacts of the use of the technology described in part (a) based on a detailed understanding of the scientific research and associated technology described in part (a)	9–10
• Provides an accurate judgement of both the positive and negative impacts of the use of the technology described in part (a) based on a detailed understanding of the relevant scientific research and associated technology described in part (a)	7–8
• Explains the positive and negative impacts of the use of the technology described in part (a) based on a good understanding of the relevant scientific research and associated technology described in part (a)	5–6
• Explains the positive and negative impacts of the use of the technology described in part (a) based on a rudimentary understanding of the relevant scientific research and associated technology described in part (a)	3–4
• States a positive and a negative impact of the use of the technology or scientific research described in part (a)	1–2

Question 8 (a) (5 marks)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Provides at least two relevant features of both minimum tillage and crop rotation and how these influence sustainability	4–5
• Provides at least one feature of both minimum tillage and crop rotation and how these influence sustainability OR • Provides at least 2 relevant features of either minimum tillage or crop rotation	2–3
• Provides a relevant feature of either minimum tillage or crop rotation	1

Question 8 (b) (10 marks)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Provides relevant details of the role of microbes and invertebrates in improving and/or maintaining soil fertility • Makes a judgement based on criteria of the role of microbes and invertebrates in soil fertility	9–10
• Provides some details of the role of microbes and invertebrates in improving and/or maintaining soil fertility • Makes a judgement based on criteria of the role of microbes and invertebrates in soil fertility	7–8
• Provides a few details of the role of microbes and invertebrates in improving and/or maintaining soil fertility	5–6
• Provides a few details of the activities of microbes or invertebrates, or their general role in improving and/or maintaining soil fertility	3–4
• Outlines the general role of microbes/invertebrates in soil fertility	1–2

Question 9 (a) (5 marks)

Outcomes assessed: H2.1

MARKING GUIDELINES

Criteria	Marks
• Provides the characteristics/features of two types of interference in plant communities	4–5
• Provides characteristics or features of one type of interference in plant communities OR • States two examples of plant interference	2–3
• States one example of plant interference	1

Question 9 (b) (10 marks)

Outcomes assessed: H2.1

MARKING GUIDELINES

Criteria	Marks
• Determines the value, based on criteria, of how farmers may use plant interference to their benefit • Provides three relevant examples to support this judgement	9–10
• Provides a judgement in general terms related to criteria, of how farmers may use plant interference to their benefit • Provides three relevant examples to support this judgement	7–8
• Provides some explanation of how plant interference is beneficial to farmers, with reference to two to three examples	5–6
• Provides some details of examples of plant interference beneficial to farmers OR • Provides general details of plant interference beneficial to farmers	3–4
• Provides one or two examples of beneficial plant interference	1–2

Written Paper — Agriculture Paper 2

Question 1 (a) (3 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies at least two appropriate financial techniques • Provides characteristics/features of each technique that enables it to be used to determine the financial status of a farm	3
• Identifies at least two appropriate financial techniques • Provides one characteristic/feature of one of these techniques that enables it to be used to determine the financial status of a farm	2
• Indicates a characteristic/feature of one financial technique OR • Identifies two appropriate financial techniques	1

Question 1 (b) (4 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies a suitable financing option for each venture • Provides details of how each financing option is appropriate for each venture	4
• Identifies a suitable financing option for each venture • Provides some details of how each financing option is appropriate for each venture	3
• Identifies a suitable financing option for one venture and provides details as to why it is suitable for the venture OR • Identifies a suitable financing option for each venture without providing details of suitability	2
• Identifies a suitable financing option for each venture	1

Question 1 (c) (8 marks)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Names an appropriate study • Draws out and relates the possible implications of the research methodology used in the study, including data collection, presentation and interpretation	7–8
• Names an appropriate study • Draws out and relates some implications of the research methodology used in the study, including the data collection, presentation and interpretation	5–6
• Names an appropriate study • Provides characteristics/features of the research methodology used in the study	3–4
• Names an appropriate study	1–2

Question 2 (a) (3 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies at least two management techniques that manipulate the rate of growth and development • Provides characteristics/features of each of these techniques	3
• Identifies at least two management techniques that manipulate the rate of growth and development • Provides one characteristic/feature of one of these techniques	2
• Provides a characteristic/feature of one management technique OR • Identifies two management techniques	1

Question 2 (b) (4 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• States that vaccination causes an artificially triggered immune response in animals • Relates the effect of the vaccination and how this causes a resistance to antigens	4
• States that vaccination causes an artificially triggered immune response in animals • Relates the general effect of the vaccination and how this causes a resistance to antigens	3
• Provides a general outline of how vaccination works • Provides a general outline of its role in preventing disease	2
• Provides a basic outline of vaccination	1

Question 2 (c) (8 marks)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Names an appropriate study • Draws out and relates the possible implications of the research methodology used in the study, including data collection, presentation and interpretation	7–8
• Names an appropriate study • Draws out and relates some implications of the research methodology used in the study, including the data collection, presentation and interpretation	5–6
• Names an appropriate study • Provides characteristics/features of the research methodology in the study	3–4
• Names an appropriate study	1–2

Question 3 (a) (3 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Names a horticultural plant • Provides characteristics/features which are either valuable or cause problems for the commercial production of this plant	3
• Names a horticultural plant • Provides at least one characteristic/feature which is either valuable or causes problems for the commercial production of this plant	2
• States why a named horticultural plant is useful	1

Question 3 (b) (4 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Provides workable strategies for improving the economic viability and environmental sustainability, indicating clearly how the effects of these strategies would bring about improvements in the production system	4
• Provides workable strategies for improving the economic viability and environmental sustainability, with some reference to how the effects of these strategies would bring about improvements in the production system	3
• Lists a production system and identifies a relevant strategy for improving economic viability and environmental sustainability OR • Lists a production system and identifies relevant strategies for improving either economic viability or environmental sustainability	2
• Lists a production system and identifies a relevant strategy for improving either economic viability or environmental sustainability	1

Question 3 (c) (8 marks)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Names an appropriate study • Draws out and relates the possible implications of the research methodology used in the study, including data collection, presentation and interpretation	7–8
• Names an appropriate study • Draws out and relates some implications of the research methodology used in the study, including the data collection, presentation and interpretation	5–6
• Names an appropriate study • Provides characteristics/features of the research methodology used in the study	3–4
• Names an appropriate study	1–2

Question 4 (a) (3 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies at least two marketing techniques • Provides characteristics/features of each technique that makes each suitable for marketing alternative production systems or technologies	3
• Identifies at least two marketing techniques • Provides at least one characteristic/feature of one technique that makes it suitable for marketing alternative production systems or technologies	2
• Identifies one marketing technique	1

Question 4 (b) (4 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Names two relevant aspects of animal biology or plant biology • Shows the relationship of these aspects to the management of an alternative production system or technology	4
• Names two relevant aspects of animal biology or plant biology • Shows the relationship between animal biology or plant biology and how an alternative production system or technology for that plant or animal may be managed	3
• Names two relevant aspects of animal biology or plant biology OR • Names one relevant aspect of animal biology or plant biology and shows its relationship to an alternative production system or technology	2
• Names one relevant aspect of animal biology or plant biology	1

Question 4 (c) (8 marks)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Names an appropriate study • Draws out and relates the possible implications of the research methodology used in the study, including data collection, presentation and interpretation	7–8
• Names an appropriate study • Draws out and relates some implications of the research methodology used in the study, including the data collection, presentation and interpretation	5–6
• Names an appropriate study • Provides characteristics/features of the research methodology used in the study	3–4
• Names an appropriate study	1–2

Question 5 (a) (3 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Names at least two plant hormones • Provides characteristics/features of the action of each hormone on growth and development	3
• Names at least two plant hormones • Provides at least one characteristic/feature of the action of one hormone on growth or development	2
• Names at least one plant hormone and indicates a feature of the action of the hormone	1

Question 5 (b) (4 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Provides detail of cellular anatomy of two plant organs • Links aspects of the cellular anatomy of each organ to the function of each of the organs	4
• Provides some detail of cellular anatomy of two plant organs • Links the structure of each organ to its function	3
• Provides detail of cellular anatomy of one plant organ • Links the structure of the organ to its function OR • Provides one aspect of cellular anatomy of two plant organs only	2
• Provides one aspect of cellular anatomy of one plant organ and gives a limited explanation of how this aspect of its structure relates to function	1

Question 5 (c) (8 marks)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Names an appropriate study • Draws out and relates the possible implications of the research methodology used in the study, including data collection, presentation and interpretation	7–8
• Names an appropriate study • Draws out and relates some implications of the research methodology used in the study, including the data collection, presentation and interpretation	5–6
• Names an appropriate study • Provides characteristics/features of the research methodology used in the study	3–4
• Names an appropriate study	1–2

Question 6 (a) (3 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies some characteristics/features of the Australian land capabilities system • Indicates how this system has been applied to the land use of an area to ensure sustainable land use	3
• Provides features of the land capabilities system, and shows some awareness of the relationship to sustainable land use	2
• States one feature of the land capabilities system	1

Question 6 (b) (4 marks)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Provides reasons for the causes of dryland and irrigation salinity • Establishes a link between the causes and their effects on the soil	4
• Provides reasons for the causes of dryland and irrigation salinity • Establishes a general link between the causes and their effect on soil	3
• Provides reasons for the causes of dryland and irrigation salinity OR • Provides reasons for the causes of either dryland or irrigation salinity and establishes a link between the cause and its effect on soil	2
• Names one factor that causes salinity	1

Question 6 (c) (8 marks)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Names an appropriate study • Draws out and relates the possible implications of the research methodology used in the study, including data collection, presentation and interpretation	7–8
• Names an appropriate study • Draws out and relates some implications of the research methodology used in the study, including the data collection, presentation and interpretation	5–6
• Names an appropriate study • Provides characteristics/features of the research methodology used in the study	3–4
• Names an appropriate study	1–2

Optional Research Project

Task: Optional Research Project (30 marks)

The research project enables students to study a particular agricultural issue or problem. The scope of the issue or problem open to students includes those that arise from production, the economic environment, marketing and the social environment.

The material submitted by students for the research project consists of a report and process journal. The report communicates the research methodology, data analysis and evaluation of the research project. It must consist of at least 3000, and no more than 5000, words. The process journal details the student's progress throughout the research project, and is verified by the student's teacher.

The balance between various segments of the report may alter, depending on the specific nature of the research project undertaken and the resources available to the student.

Assessment of the project will be based on the extent to which the research project fulfils the outcomes and content specified in the syllabus.

The report must include:

- a research question
- synopsis or abstract
- literature review
- research methodology
- results
- data analysis
- conclusions
- ethical and welfare issues
- recommendations
- referencing and acknowledgements

Assessment criteria

- Presentation of a cohesive, well-reasoned and detailed report on an appropriate independent investigation
- Inclusion of appropriate supporting material, such as graphs, figures, tables, slides and photographs
- Identification of an appropriate research question in an agricultural situation
- Provision of an accurate synopsis or abstract of the investigation
- Evidence of a comprehensive literature review
- Application of appropriate research methodology and technologies
- Presentation of results, appropriate data analysis and drawing of accurate and relevant conclusions from this investigation
- Identification and evaluation of ethical and welfare issues relevant to this research and the wider field of agricultural research
- Presentation of detailed and appropriate recommendations drawn from this research and supported by the data and/or research
- Inclusion of accurate referencing and acknowledgments

Outcomes assessed: H3.4, H4.1, H5.1

MARKING GUIDELINES

Criteria	Marks
• Presents a cohesive, well-reasoned and detailed research report, supplemented by a variety of appropriate additional material, such as graphs, figures, tables, slides and photographs • Provides an accurate synopsis or abstract and a comprehensive and relevant literature review of a range of different types of literature • Selects and applies appropriate technologies and extensive research methods for this investigation, collects and presents all relevant data in an appropriate way, thoroughly and correctly analyses the data and draws accurate and relevant conclusions • Identifies and evaluates a range of ethical and welfare issues relevant to the design of this research and the wider field of agricultural research • Makes a comprehensive, detailed and appropriate set of recommendations drawn from this research and supported by the data and/or research • Includes accurate referencing and suitable acknowledgments	25 – 30
• Presents a cohesive and well-reasoned research report that is supplemented by appropriate additional material, such as graphs, figures, tables, slides and photographs • Provides an accurate synopsis or abstract and a relevant literature review of different sources • Selects and applies appropriate technologies and research methods for this investigation, collects and presents most relevant data in an appropriate way, correctly analyses this data and draws accurate and relevant conclusions • Identifies and discusses a range of ethical and welfare issues relevant to the design of this research and the wider field of agricultural research • Makes several appropriate recommendations drawn from this research and supported by the data and/or research • Includes accurate referencing and a set of acknowledgments	19 – 24

Criteria	Marks
• Presents a sound research report, supplemented by appropriate additional material, such as graphs, figures, tables, slides and photographs • Provides an incomplete synopsis or abstract and a limited literature review • Selects and applies most appropriate technologies and steps in the research methods for this investigation, collects and presents some relevant data in an appropriate way, correctly analyses this data and draws accurate and relevant conclusions • Identifies and describes some ethical and welfare issues relevant to the design of this research and the wider field of agricultural research • Makes few appropriate recommendations drawn from this research and supported by the data and/or research • Includes incomplete referencing and several acknowledgments	13 – 18
• Presents a basic research report, supplemented by some additional appropriate material, such as graphs, figures, tables, slides and photographs • Provides a limited synopsis or abstract and a limited literature review • Selects and applies several appropriate steps in the research methods and technologies for this investigation, collects and presents some relevant data, attempts to analyse this data and draw conclusions • Identifies some ethical and welfare issues relevant to the design of this research and the wider field of agricultural research • Makes recommendations that may not be appropriate or supported by the data and/or research • Includes references and acknowledgments that may be incomplete or inaccurate	7 – 12
• Presents a limited research report, supplemented by few, or inappropriate, additional materials • Provides a basic literature review • Selects and applies several steps in the research methods and technologies for this investigation, collects and presents some data with inappropriate analysis • Identifies one or two ethical and welfare issues relevant to the design of this research and the wider field of agricultural research • Includes references and acknowledgments that are inadequate	1 – 6