2006 HSC Notes from the Marking Centre Agriculture

Published by Board of Studies NSW
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ISBN 978 174147 6217

2007135

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2006 HSC NOTES FROM THE MARKING CENTRE AGRICULTURE

Introduction

This document has been produced for the teachers and candidates of the Stage 6 course in Agriculture. It provides comments with regard to responses to the 2006 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.

This document should be read along with the relevant syllabus, the 2006 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.

General Comments

In 2006, 1385 candidates attempted the Agriculture examination.

Teachers and candidates should be aware that the knowledge, understanding and skills developed through the study of all syllabus sections should accumulate to a more comprehensive understanding than may be described in each section separately. Examiners may ask questions that require candidates to respond by integrating their knowledge, understanding and skills developed through studying the entire course, rather than focusing on discrete syllabus 'dot points' and associated 'key words'.

Paper 1

Section I

Question 1

(a) Most candidates were able to state one way in which the named product is sold. The majority stated a mode of sale (eg auction) or place of sale such as saleyards or supermarket. Other valid responses identified marketing strategies (eg through advertising or target marketing) or stated the product form (eg fresh/raw or processed).

(b) Better responses gave a detailed outline of a method used on farms to improve the quality of the named product. These responses linked the method outlined with specific quality traits, for example, increasing the grain intake of cattle to increase the development of the more favoured white fat or feed-lotting to increase marbling. Poorer responses were limited to identifying an on-farm method, providing no information on what qualities in the product were being improved.

(c) Better responses showed a good grasp of consumer demands for their product and the off-farm processing that occurs as a result of that demand. Mid-range responses provided some detail of an off-farm process or consumer demands. Weaker responses could either identify a consumer demand or a form of off-farm processing. Some responses did not identify a consumer demand or off-farm process and merely outlined how consumer demand in general affects supply and/or the price of the product.

(d) Better responses outlined an appropriate form of government intervention for the product and expanded their answer by linking this intervention to effects on the production or marketing of the named product. Poorer scoring responses only identified one or two forms of intervention in relation to their product and provided no explanation of the link to production or marketing. Some of the interventions in such responses were not governmental, for example, Australian Wheat Board and Growers' Co-operatives, while others were interventions not currently in use in Australia, for example, beef 2 price scheme, dairy quotas, subsidies.

Question 2

(a) Many responses correctly identified a way nutrients may be lost from the farm system, such as leaching or product harvest. Some responses simply stated ways in which nutrients were cycled within the system.

(b) Most responses correctly stated a practical method used to manage nutrients in a farming system. Better responses provided some features of how the method managed nutrient levels.

(c) Most responses described the involvement of micro-organisms in the breakdown of organic matter into simpler, more available compounds. Poorer responses only showed a general understanding that micro-organisms/invertebrates are involved in nutrient cycles. Better responses explained in detail the role of a named micro-organism/invertebrate in the cycling of a specific nutrient and were able to show some change in form of a nutrient within the cycle.

Question 3

(a) Better responses included appropriate scales and labels on the axes and accurately plotted a line graph or drew a column graph. A significant number of candidates made an error when constructing the scales and/or put the uncontrolled variable on the horizontal axis.

(b) The majority of candidates recognised that the 0 kg N/ha rate was included as a control and that it provided the basis for the comparison of results from all the treatments.

(c) Better responses gave at least one valid reason for using a different rate of application and supported this with a well-reasoned argument. Many recognised that an application rate of 40kg/ha may be more profitable than 80 kg/ha and used a cost/benefit analysis to justify their decision. Many candidates also argued that a lower rate of application could be justified on environmental and/or sustainability grounds. Weaker responses mentioned a valid reason for using a different rate but did not provide an adequate supporting argument.

Section II

Question 4

(a) Most responses correctly accounted for an increased need for ME due to the presence of a developing lamb.

(b) In the best responses, candidates were able to relate increased ME levels to increased ovulation rates and hence higher fertility of ewes due to the increased occurrence of multiple births.

(c) Better responses selected two factors, other than nutrition, such as day length, temperature or disease, and clearly linked these to valid biological reasons for changes in fertility. Weaker responses only identified factors affecting fertility or outlined changes to fertility. Some responses incorrectly used 'nutrition' as a factor, despite the question directing them not to do so.

(d) Better responses selected an appropriate 'breeding system', for example crossbreeding, line breeding, and demonstrated an understanding of the genetic basis of the chosen system, for example heterosis, multi-gene inheritance, widening gene pools etc. They then related these to improved animal production. Weaker responses showed little understanding of the genetic basis of a breeding system or its subsequent impact on production. The poorest responses did not identify a 'breeding system', and confused this with a breeding technology or technique, such as artificial insemination (AI) or embryo transfer (ET), genetic engineering or estimated breeding values (EBVs).

Question 5

(a) Most candidates accurately read the label and listed four items of safety equipment. Some responses gave information regarding safe chemical use that was not from the label provided.

(b) In the best responses, candidates identified an incorrect usage of chemicals, its effect and linked this to the farm production system. Weaker responses failed to identify a particular incorrect usage or did not link the effect to the production system.

(c) Better responses named two appropriate environmental factors and, in each case, detailed effects on plant production. Mid-range responses often completed this for one factor, but only described the factor and not the effect on the production for the second factor. Weaker responses described one or two environmental factors, but did not link them to plant production.

(d) Better responses displayed a sound knowledge and understanding of native pastures and their role within pasture production systems while providing a number of their advantages and disadvantages. Mid-range responses provided a number of advantages and disadvantages but did not make a link to the pasture production system. Weaker responses listed, or outlined in a limited way, some advantages and/or disadvantages of native pastures.

Section III

Question 6

Approximately 34% of candidates attempted this question.

(a) Many responses identified two measurable characteristics of soil such as pH, texture or nutrient status. Better responses described the key features of both measurable characteristics.

(b) Most responses outlined harmful environmental effects of agriculture rather than discussing strategies to reduce these effects. Better responses provided examples of how the broader community and farmers could work together.

Question 7

Approximately 21% of candidates attempted this question.

(a) Most candidates stated clearly that host, pathogen and environment were all necessary in causing disease. The majority of responses then outlined at least two interactions. Better responses provided characteristics and features of all three interactions.

(b) Many responses outlined a number of management strategies that control levels of pathogenic organisms on a farm. Better responses provided a number of points for and/or against the various strategies identified.

Question 8

Approximately 19% of candidates attempted this question.

(a) Most candidates were able to identify one or more components of climate. Better responses outlined climatic information and linked this to the farmer's decision-making process. The best responses described at least two pieces of climatic information and linked this to the farmer's decision-making process, or provided detail in the decision-making process based on one aspect of climate.

(b) Many candidates were able to outline two or more components of plant interference. Better responses were able to describe the components of plant interference and suggest management strategies to improve plant production. The best responses provided points for and/or against the management strategies that manipulated aspects of plant interference to improve plant production.

Question 9

Approximately 28% of candidates attempted this question.

(a) Most candidates were able to identify a number of animal welfare requirements. Better responses provided detailed examples to illustrate how these requirements could be met by farmers.

(b) Most candidates were able to identify specific animal hormones or outline generally the effects of animal hormones. Mid-range responses addressed the effects of animal hormones on both production and behaviour. The best responses provided points for and/or against the effects of appropriate hormones on production AND behaviour.

Paper 2

Candidates who did not submit a Research Project attempt this paper. Approximately 96% of candidates who sat Paper 1 attempted Paper 2. Candidates are required to answer two elective questions from a choice of six.

Part (b) of each question required candidates to describe aspects of research methodology, data analysis or data presentation relating to a study relevant to the particular elective. Generally, candidates who had knowledge of a particular piece of relevant research ('a study') were able to provide adequate answers. A considerable number of candidates still do not appear to have covered this section of the syllabus well and were unable to answer the question, as they did not understand the concept of 'a study'.

Question 1 – Agribusiness

Approximately 8% of elective candidates attempted this question.

(a) Most candidates were able to name an international market that impacted on farm business. Better responses then linked the impact of an international market to an effect on a farm business.

(b) Few candidates were able to identify a study related to a rural business. Better responses identified a study and provided key features and characteristics of the study's findings, specifically relating to their impact on a rural business.

(c) Most candidates were able to identify an advisory service. Mid-range responses provided features of the role of advisory services. Better responses made judgements valuing the role of advisory services in influencing farmers' decision-making processes.

Question 2 – Animal Management

Approximately 72% of candidates attempted this question.

(a) Many candidates confused genetic technologies such as transgenics, genetic engineering and cloning with genetic-related procedures or techniques such as embryo transfer (ET) and artificial insemination (AI). Most responses provided clear outlines of a potential impact of the stated technology on animal production systems.

(b) Most candidates could name a specific study related to a current animal production technology/technique and named features of experimental design used, such as randomisation and standardisation.

Better responses described the actual methods used to ensure unbiased results such as using tables of random numbers to allocate treatments. They then described how the experimental design aspect related to reducing bias, for example the use of randomisation to mitigate possible selection bias.

(c) Many responses did not clearly distinguish subjective from objective measurements. Most candidates identified a breeding program such as Lambplan and recognised the importance of measurement in its application.

Better responses identified criteria such as *accurate selection* and *genetic gain* on which to judge objective measurement. Strongest responses then clearly judged the value of objective measurement in the context of their breeding program against these chosen criteria (accurate selection and genetic gain).

Question 3 – Horticulture

Approximately 13% of candidates attempted this question.

(a) The majority of candidates were able to state one way in which horticulture is important to the Australian economy, for example providing employment, or products such as fruit, vegetables.

Most candidates were able to make a link between the effect and the economy, for example by providing a product such as vegetables which can be exported and produce income for Australia.

Better responses made clear links between the effect and how it helped the economy.

(b) Few candidates related their answer to a named study. Most responses identified one technological innovation used in the horticultural industry, but did not include any aspects of experimental design, for example randomisation, replication, standardisation and control.

Better responses provided a brief outline of an appropriate study, including details of each aspect of the experimental design clearly linked to their role in the study, for example a control was used to provide a comparison with the various treatments used in the particular study.

(c) Some candidates were able to briefly outline the importance of balancing economic viability with environmental sustainability, but failed to provide examples of appropriate management strategies. Rarely did a response provide any judgements of the strategy's worth in balancing economic viability with environmental sustainability.

Better responses clearly evaluated management procedures/decisions and linked these to both economic viability and environmental sustainability.

Question 4 – Innovation and Diversification

Approximately 5% of candidates attempted this question.

(a) Most candidates were able to name one legal or other institutional requirement associated with establishing an alternative agricultural system, enterprise or technology. Better responses identified and outlined a legal or institutional requirement and also stated its effect on the establishment of an alternative system/enterprise/technology, for example animal welfare – vet required to remove deer antler, increasing cost of production.

(b) Most responses identified a study that had been undertaken in an alternative agricultural system/technology. Examples included deer nutrition and effect of hybrid vigour in rabbits on reproduction and weight gains. Better responses provided details of the types of information or data from an identified study. Poorer responses merely stated data types used in an identified study.

(c) Very few candidates were able to evaluate the factors considered by the farm manager for the successful introduction of an alternative agricultural system/technology. Many responses provided features of two key factors in detail, such as economics/cost consideration; physical, chemical and biological considerations of the enterprises. The best responses included a judgement of their value in the successful introduction of a new system or technology.

Question 5 – Plant Management

Approximately 28% of candidates attempted this question.

(a) Many candidates had difficulty in distinguishing between techniques that produce new genetic material and those concerned with vegetative propagation. Better responses identified and sketched generally a method for producing new genetic material such as cross breeding or genetic engineering.

(b) Many candidates were not able to identify a suitable study. Better responses not only provided a valid study but demonstrated understanding of data collection techniques and experimental methodology.

(c) Many candidates responded to this question by listing or outlining techniques but were unable to make appropriate judgements about the techniques. Better responses put forward judgements as to the value of both water and nutrient uptake management techniques when producing plants.

Question 6 – Sustainable Management

Approximately 67% of candidates attempted this question.

(a) The majority of candidates were able to identify a recommended procedure to alleviate a named soil degradation problem (minimal/zero tillage, planting deep rooted trees, legume based crop rotation). Best responses outlined how the named practice alleviated the named soil degradation problem.

(b) Many candidates could name an efficient water use study. A significant number could state several methods used to present research data. The better responses articulated how the data presentation method was used to show particular research results from the study. Higher scoring responses provided greater detail about the presentation of data in the ways identified eg managing information, easier to read, shows trends, allows comparisons and/or provides useful information/data for further calculations.

(c) Most responses identified farming practices that caused a named form of soil degradation. Some candidates misinterpreted the question and described several types of soil degradation. Better responses outlined a causal relationship between the practices and the degradation. Few candidates could evaluate the importance of the practices, providing simplistic judgements.

The best responses articulated an evaluative discussion that contained ideas about:

- the advantages and disadvantages of performing or not performing a management practice
- judgements measured against a benchmark and/or acknowledged criteria for performing or not performing a management practice, or
- following a discussion through to social, environmental and economic consequences for performing or not performing a particular management practice.

Optional Research Project

Approximately 4% of the 2006 HSC Agriculture candidature submitted a research project.

A range of research topics were presented, and both quantitative (a large majority) and qualitative research methodologies were represented.

Projects that gained high marks were characterised by:

- the selection of a relevant agricultural problem
- the statement of a clear research question
- the use of appropriate experimental design, data collection and data analysis
- appropriate conclusions drawn from the data collected and meaningful recommendations emanating from the research question and findings
- flexibility in drawing conclusions and responding to unexpected findings, trends and outcomes of the research
- good structure, ie the project was within the 3000–5000 word limit and presented cohesively
- the inclusion of a properly referenced, concise and relevant literature review that focused directly on previous research associated with the research question. Reviewed literature was referred to throughout the project and not presented in isolation
- consideration of ethical and welfare issues related to the research conducted

- the inclusion of a precise synopsis of the research and an accurate bibliography
- appropriate acknowledgement of all sources, collaboration and assistance.

The better projects were accompanied by process journals that clearly detailed the candidate's progress in developing and conducting the research as well as the assistance sought during the process. Students are reminded that a process journal must be submitted with the project. The journal details progress and must be verified by the teacher. The journal is not marked but is used for verification that the student has carried out the research identified in the formal report.

Weaker projects often did not articulate a clearly defined research question that was relevant to modern agriculture. In these projects the research methodology, data collection techniques and data analysis often contained serious flaws. Often the number of replicates was insufficient, showing a basic lack of knowledge of research methodology.

Many projects contained a weak literature review. They presented all the information about the topic in general and were not directly related to the research question. Many candidates did not refer to previous research. It should be noted that the recency and relevance of the literature reviewed is critical. The quantity of material presented is not important. The literature review should discuss previous research in relation to the issue or problem that is the subject of the research and attempt to outline the current state of knowledge about the issue under investigation. Higher-scoring projects not only presented relevant literature reviews, but also related their own findings back to those of other researchers. These projects were well organised and demonstrated a clear understanding of the role of the literature review in a research project.

Many of the weaker quantitative projects displayed poor experimental design – too many variables, inadequate replication, lack of randomisation and poor attention to standardisation of conditions. Some qualitative studies used an inadequate sample size, leading to less meaningful results and then making it difficult for the candidate to draw conclusions and write discussions. Poor experimental design then hindered the analysis of the results and the development of meaningful conclusions. Projects with such flaws rarely acknowledged this error or provided suitable recommendations to rectify faults in future research.

Candidates undertaking survey-based research should be advised that there are well-documented strategies and conventions for designing questions. Surveys often lacked a large enough sample size or were extremely biased in their sampling technique.

The analysis of the statistics collected should clearly show that the candidate understands the analysis and does not merely regurgitate information. Those that rely on computer-based analysis, often undertaken by a third party, are most at risk of displaying a complete lack of understanding of what the analysis produces as a result. It is clear from student journals that complicated computer-based analysis done by others often confuses them. The analysis must be appropriate for the data collected. Too many candidates perform an analysis of variance in a trial with several variables, find some significant differences in the data but then fail to analyse where the significant differences occur. Many find no significant differences between treatments but then go on to make statements about differences between treatments in their conclusions and discussion of results. This suggests that these candidates do not understand the purpose of statistical analysis of their results. A number of candidates proposed an incorrect null hypothesis that resulted in incorrect conclusions to be drawn from the statistical analysis.

Many candidates presented poor referencing in their projects with no clear link from the text to the details in the reference section. Often website references were not dated. It should be noted that where a website provides a window to a publication, the publication should be cited, not the website. Highest quality literature reviews were produced by candidates that referenced current material from a wide range of sources of different types. It is expected that material cited in a literature review has been read by the candidate and used to produce the final review.

The presentation of data should be ethical and unbiased. In the presentation of data, many candidates continue to present discontinuous scales on graphs. This makes results look more significant, but it is not an accurate presentation of data. Where histograms are used, candidates should be encouraged to include standard deviations or standard errors on the graph. Some candidates attempt to pad out results by presenting the same data in several graphical forms or present graphs of raw data on each experimental group rather than a final graph to compare means of each treatment. An example would be line graphs which show the growth of every animal in each treatment group rather than one which compares the mean of the animals in each group. In many cases line graphs were inappropriately used to represent discontinuous data.

Candidates should be encouraged to develop an original research question, and not one very similar to other candidates from their own centre. The Rules for the Research Project require that each student must submit an individual research project based on the student's original, individual investigation. These rules require that the work presented in the project must have been undertaken by the student and the results must be based on the student's own investigation.

Unfortunately some candidates chose questions that were a little too challenging for their available time or resources. This led to an inability to analysis the data, draw conclusions and make meaningful discussions.

A few candidates simply submitted a report, describing a topic without conducting any experimental investigation. The lack of 'research' in these research projects understandably resulted in a low mark range, despite the volume of material presented.

Many of the better projects indicated in their journals that they had had regular consultation with their agriculture teacher and other experts to monitor experimental design, statistical analysis and their research for the literature review. These projects used the journal appropriately, documenting field notes, raw results, interview notes and reflections of the candidate. When used correctly they provide an excellent window into the candidate's development as they research, carry out the trial and grapple with the final write-up. These journals are not intended to create extra work and need not be typed up and presented as a polished document bound with the project. Ideally they should be raw diaries, in exercise or note books, reflecting the passage of time and the development of the candidate's work. Simple tables where teachers sign off components of the write up are not suitable as process journals. Journals should not be written up at the end of the research. It is expected that they are 'works in progress' produced as the research project develops.

If candidates are to be involved in research carried out by others it should be clear that they had substantial input into design, data collection and analysis of an individually run section. Ideally they should be involved from the inception of the research. At a minimum, they should play a substantial role in the collection of experimental data and complete the write up without undue input or assistance from others. They should acknowledge any assistance, the degree of that assistance and all sources of information.

Agriculture Paper 1

2006 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
Section I			
1 (a)	1	Farm/Product Study	H3.2
1 (b)	2	Farm/Product Study	H3.1, H3.3
1 (c)	3	Farm/Product Study	H3.3
1 (d)	4	Farm/Product Study	H3.2
2 (a)	1	Sustainable Agricultural Production	H1.1, H2.2
2 (b)	2	Sustainable Agricultural Production	H2.2
2 (c)	4	Sustainable Agricultural Production	H1.1
3 (a)	3	Experimental analysis	H2.1
3 (b)	2	Experimental analysis (role of control)	H2.1
3 (c)	3	Experimental analysis (recommendations)	H1.1
Section II			
4 (a)	2	Animal Production systems (Nutrition)	H2.2
4 (b)	3	Animal Production systems (Nutrition)	H2.2
4 (c)	4	Animal Production systems (Fertility of Farm Animals)	H2.2
4 (d)	6	Animal Production systems (Animal breeding systems)	H2.2
5 (a)	2	Interpret a Chemical label	H1.1
5 (b)	3	Chemical usage in Agriculture	H1.1
5 (c)	4	Plant Production Systems (Environmental constraints on plants)	H2.1
5 (d)	6	Plant Production Systems (Role of Native Pastures in Agriculture)	H2.1
Section III			
6 (a)	5	Sustainable Agricultural Production (Chemical and physical characteristics of soils)	H1.1
6 (b)	10	Sustainable Agricultural Production (Roles of reducing harmful effects)	H1.1
7 (a)	5	Microbes and Invertebrates (Plant/animal disease)	H1.1
7 (b)	10	Microbes and Invertebrates Plant/Animal disease	H2.1, H2.2
8 (a)	5	Analyse and interpret agricultural data (Climatic information)	H1.1
8 (b)	10	Plant Production Systems (Plant interference)	H2.1
9 (a)	5	Animal welfare and legal issues	H1.1
9 (b)	10	Animal Production systems (Animal hormones)	H2.2

Agriculture Paper 2

2006 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
Question 1 — Agribusiness			
1 (a)	3	Innovation, ethics, current issues	H5.1
1 (b)	4	Research methodology	H4.1
1 (c)	8	Processes in Agricultural systems	H3.4
Question 2 — Animal Management			
2 (a)	3	Innovation, ethics, current issues	H5.1
2 (b)	4	Research methodology	H4.1
2 (c)	8	Processes in Agricultural systems	H3.4
Question 3 — Horticulture			
3 (a)	3	Innovation, ethics, current issues	H5.1
3 (b)	4	Research methodology	H4.1
3 (c)	8	Processes in Agricultural systems	H3.4
Question 4 — Innovation and Diversification			
4 (a)	3	Innovation, ethics, current issues	H5.1
4 (b)	4	Research methodology	H4.1
4 (c)	8	Processes in Agricultural systems	H3.4
Question 5 — Plant Management			
5 (a)	3	Innovation, ethics, current issues	H5.1
5 (b)	4	Research methodology	H4.1
5 (c)	8	Processes in Agricultural systems	H3.4
Question 6 — Sustainable Land and Resource Management			
6 (a)	3	Innovation, ethics, current issues	H5.1
6 (b)	4	Research methodology	H4.1
6 (c)	8	Processes in Agricultural systems	H3.4

BOARD OF STUDIES
NEW SOUTH WALES

2006 HSC Agriculture Paper 1
Marking Guidelines

Section I

Question 1 (a)

Outcomes assessed: H3.2

MARKING GUIDELINES

Criteria	Marks
• States ONE way the named product is sold	1

Question 1 (b)

Outcomes assessed: H3.1, H3.3

MARKING GUIDELINES

Criteria	Marks
• Sketches in general terms one on-farm method that may be used to improve the quality of the named product	2
• Identifies ONE on-farm method used to improve the quality of the named product	1

Question 1 (c)

Outcomes assessed: H3.3

MARKING GUIDELINES

Criteria	Marks
• Outlines an off-farm processing step that may be changed or developed and links this to consumer demand	3
• Outlines an off-farm processing step for the named product OR • Outlines a consumer demand factor for the named product	2
• Identifies ONE off-farm processing step for the named product OR • Identifies a consumer demand factor	1

Question 1 (d)

Outcomes assessed: H3.2

MARKING GUIDELINES

Criteria	Marks
• Outlines at least ONE way governments may intervene and links this clearly to how it affects the production or marketing of the named product	4
• Outlines at least ONE way governments may intervene in the production or marketing of the named product	3
• Identifies at least TWO ways governments may intervene in production or marketing of the named product OR • Outlines ONE way governments may intervene in production or marketing OR • Outlines ONE effect of government intervention	2
• Identifies ONE way governments may intervene in production or marketing of a product	1

Question 2 (a)

Outcomes assessed: H1.1, H2.2

MARKING GUIDELINES

Criteria	Marks
• States ONE way nutrients may be lost from the farming system	1

Question 2 (b)

Outcomes assessed: H2.2

MARKING GUIDELINES

Criteria	Marks
• Sketches in general terms ONE method a farmer may use to manage nutrient levels in a farm system	2
• Names ONE method a farmer may use to manage nutrient levels in a farm system	1

Question 2 (c)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Outlines the role of micro-organisms or invertebrates in the cycling of nutrients and relates this role to some change in form of a nutrient within the cycle	4
• Identifies a micro-organism or invertebrate and outlines its role in the cycling of nutrients OR • Outlines the key features of the cycling of a nutrient that involves micro-organisms or invertebrates	3
• Identifies a micro-organism or invertebrate and identifies its role OR • Outlines the role of micro-organisms or invertebrates in the cycling of nutrients	2
• Identifies a micro-organism or invertebrate that assists in the cycling of nutrients OR • Identifies a role of micro-organisms or invertebrates in the cycling of nutrients	1

Question 3 (a)

Outcomes assessed: H2.1

MARKING GUIDELINES

Criteria	Marks
• Data is correctly plotted on a line graph or histogram, including appropriately labeled axes	3
• The majority of data has been transposed correctly, with a minor misrepresentation in one area	2
• Some data or information has been transposed to the grid	1

Question 3 (b)

Outcomes assessed: H2.1

MARKING GUIDELINES

Criteria	Marks
• Identifies that the 0 kgN/ha rate of N is the control treatment and outlines the reason for a control in an experiment	2
• States that the 0 kgN/ha rate of nitrogen is a control treatment	1

Question 3 (c)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Outlines at least one reason why a different rate of N is appropriate and provides an argument to support the farmer's choice to do this	3
• Outlines one reason a lower or higher rate of N may be appropriate OR • Identifies more than one reason why a different rate of N is appropriate	2
• Identifies one reason why a lower or higher rate of N is appropriate	1

Section II

Question 4 (a)

Outcomes assessed: H2.2

MARKING GUIDELINES

Criteria	Marks
• States a reason for the increased level of ME needed by the ewe	2
• Identifies that there is an increased level of ME needed by the ewe	1

Question 4 (b)

Outcomes assessed: H2.2

MARKING GUIDELINES

Criteria	Marks
• Outlines the change in fertility that occurs and relates this to the improved nutrition prior to joining	3
• Outlines the fertility change that occurs in the ewe	2
• Identifies an effect on ewe fertility (increase or decrease)	1

Question 4 (c)

Outcomes assessed: H2.2

MARKING GUIDELINES

Criteria	Marks
• Outlines TWO factors that may affect fertility in farm animals and relates each of them to the effect of each factor on fertility	4
• Outlines ONE factor that may affect fertility in farm animals and relates this factor to the effect on fertility AND • Outlines ONE factor that may affect fertility in farm animals	3
• Outlines TWO factors that may affect fertility in farm animals OR • Outlines the effect of TWO factors on fertility in farm animals OR • Outlines ONE factor that may affect fertility and relates this to the effect of this factor on fertility	2
• Outlines ONE factor that may affect fertility in farm animals OR • Outlines the effect of ONE factor on fertility in farm animals OR • Identifies TWO factors that may affect fertility in farm animals	1

Question 4 (d)

Outcomes assessed: H2.2

MARKING GUIDELINES

Criteria	Marks
• Identifies the issues by providing points for and/or against the animal breeding system in improving animal production clearly linking to the genetic basis of the breeding system	5–6
• Outlines the animal breeding system and relates this to the improvement in animal production OR • Outlines the genetic basis of the animal breeding system and how this is used to improve production	3–4
• Outlines an animal breeding system OR • Outlines how genetics can influence animal production	1–2

Question 5 (a)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Identifies all FOUR pieces of safety equipment mentioned in the label	2
• Identifies at least TWO pieces of safety equipment mentioned in the label	1

Question 5 (b)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Links the incorrect procedure or usage to the effect on farm production systems	3
• Describes the effect of incorrectly using an agricultural chemical OR • Describes an incorrect usage of agricultural chemicals	2
• Identifies an effect of incorrect usage of agricultural chemicals OR • Identifies an incorrect usage of agricultural chemicals	1

Question 5 (c)

Outcomes assessed: H2.1

MARKING GUIDELINES

Criteria	Marks
• Outlines TWO environmental factors that may affect plant production and relates each of these to the effect(s) each factor has on plant production	4
• Outlines ONE environmental factor that may affect plant production and relates this factor to the effect on plant production AND • Outlines ONE factor that may affect plant production	3
• Outlines TWO environmental factors that may affect plant production OR • Outlines the effect of TWO environmental factors on plant production OR • Outlines ONE environmental factor that may affect plant production and relates this to the effect of the factor on plant production	2
• Outlines ONE environmental factor that may affect plant production OR • Outlines ONE effect of ONE environmental factor on plant production	1

Question 5 (d)

Outcomes assessed: H2.1

MARKING GUIDELINES

Criteria	Marks
• Outlines the use of native pasture species in a pasture production system by providing a number of points for and/or against the use of native pasture species	5–6
• Provides a number of points for and/or against the use of native pasture species OR • Outlines the role of native pasture species with one or two points for and/or against using native pastures	3–4
• Provides one or two points either for or against the use of native pastures OR • Outlines in general terms the use of native pasture species	1–2

Section III

Question 6 (a)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Provides the key characteristics and features of TWO soil characteristics that can be measured	5
• Outlines TWO soil characteristics OR • Outlines ONE soil characteristic and identifies another characteristic OR • Provides the key features of ONE soil characteristic	3–4
• Identifies ONE or TWO soil characteristics OR • Outlines ONE soil characteristic	1–2

Question 6 (b)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Provides a number of points for and/or against at least TWO strategies used by the broader community and farmers to reduce the harmful effects of agriculture	9–10
• Provides some points for and/or against at least TWO strategies used by the broader community and farmers, to reduce harmful environmental effects of agriculture	7–8
• Provides characteristics and features of how the broader community and farmers work to reduce harmful environmental effects of agriculture	5–6
• Outlines at least TWO ways the broader community and farmers can work together	3–4
• Identifies ONE or TWO ways farmers and the broader community work together	1–2

Question 7 (a)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Provides the characteristics and features that are required for each of the host, pathogen and environment to interact and cause disease	5
• Provides the characteristics and features that are required for any TWO of the host, pathogen or environment to interact OR • Outlines at least TWO of the host/pathogen/environment in general terms related to disease	3–4
• Outlines ONE of host/pathogen/environment in general terms related to disease OR • Identifies an interaction between any of host, pathogen or environment in disease	1–2

Question 7 (b)

Outcomes assessed: H2.1, H2.2

MARKING GUIDELINES

Criteria	Marks
• Identifies features of a range of management strategies providing points for and/or against each strategy	9–10
• Identifies features of strategies used to manage the levels of pathogenic microbes or invertebrates providing points for and/or against at least ONE of these strategies	7–8
• Provides characteristics and features of strategies and relates these to the management of levels of pathogenic microbes or invertebrates	5–6
• Outlines at least TWO management strategies used to control pathogenic microbes or invertebrates	3–4
• Identifies ONE or TWO pathogenic microbes or invertebrates OR • Identifies ONE or TWO management strategies	1–2

Question 8 (a)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Provides characteristics and features of at least TWO pieces of climatic information, linking these to the farmers use in the decision making process	5
• Provides characteristics and features of ONE piece of climatic information, linking this to the decision making process by the farmer AND • Identifies one or two components of climate OR • Outlines at least TWO pieces of climatic information	3–4
• Outlines ONE piece of climatic information OR • Identifies one or more components of climate	1–2

Question 8 (b)

Outcomes assessed: H2.1

MARKING GUIDELINES

Criteria	Marks
• Identifies features of at least TWO components of plant interference relating management strategies for each with points for and/or against each strategy	9–10
• Identifies features of at least TWO components of plant interference relating management strategies to each with points for and/or against at least ONE of these strategies	7–8
• Provides features of at least TWO components of plant interference and relates how these are managed to improve plant production	5–6
• Outlines at least TWO components of plant interference or management strategies OR outlines at least TWO management strategies to manage plant interference	3–4
• Identifies ONE or TWO components of plant interference OR • Identifies ONE or TWO management strategies to manage plant interference	1–2

Question 9 (a)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Provides characteristics and features of at least TWO animal welfare requirements in animal production systems and how the farmer is able to meet these requirements	5
• Provides characteristics and features of ONE animal welfare requirement and how the farmer meets this requirement AND • Identifies one or more other welfare requirement OR • Outlines at least TWO animal welfare requirements in animal production systems	3–4
• Outlines ONE animal welfare requirement • Identifies one or more animal welfare requirements in animal production system	1–2

Question 9 (b)

Outcomes assessed: H2.2

MARKING GUIDELINES

Criteria	Marks
• Identifies features of hormones and how they affect animal production AND behaviour in a number of positive and/or negative ways	9–10
• Identifies features of hormones including at least one positive and/or negative effect on animal production AND animal behaviour OR • Identifies features of hormones including several positive and/or negative effects on animal behaviour OR animal production	7–8
• Provides features of hormones and relates these to their effect on either animal behaviour AND animal production	5-6
• Outlines effects of animal hormones on either animal production OR animal behaviour OR • Outlines at least TWO animal hormones	3–4
• Identifies ONE or TWO hormones OR • Identifies ONE or TWO effects of hormones on animal production or behaviour	1–2

BOARD OF STUDIES
NEW SOUTH WALES

2006 HSC Agriculture Paper 2
Marking Guidelines

Question 1 (a)

Outcomes assessed: H5.1

MARKING GUIDELINES

Criteria	Marks
• Sketches in general terms an international market and clearly states the effect/s this market has had on a farm business	3
• Sketches in general terms an international market	2
• Identifies an international market that may affect a farm business OR • Identifies an effect on farm business of international markets in general	1

Question 1 (b)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Provides the features of TWO or more findings, from an identified study undertaken into the impact of a rural business on an agricultural industry, clearly linking these to the impact on the agricultural industry	4
• Provides the features of ONE finding, from an identified study undertaken into the impact of a rural business on an agricultural industry, clearly linking this to the impact on the agricultural industry AND identifies a second finding OR • Sketches in general terms at least TWO findings of a study undertaken into the impact of a rural business on an agricultural industry	3
• Identifies at least TWO findings of a study undertaken into the impact of a rural business on an agricultural industry OR • Sketches in general terms ONE finding from a study undertaken into the impact of a rural business on an agricultural industry OR • Provides the features of ONE finding from an identified study into the impact of a rural business	2
• Identifies a study that was undertaken into the impact of a rural business on an agricultural industry OR • Identifies ONE finding of a study undertaken into the impact of a rural business on an agricultural industry	1

Question 1 (c)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies at least TWO types of farm advisory services available to farmers to assist in their decision-making and places a judgement on the value of both of these services	7–8
• Identifies at least ONE type of farm advisory service available to farmers to assist in their decision-making and places a judgement on the value of this service AND • Identifies features of at least ONE other type of farm advisory service available to farmers to assist in their decision-making	5–6
• Identifies ONE type of farm advisory service available to farmers to assist in their decision-making and places a judgement on the value of this service OR • Provides the key features of at least TWO types of farm advisory services available to farmers to assist in their decision-making	3–4
• Identifies TWO types of farm advisory services that may assist a farmer's decision making process OR • Sketches in general terms a role farm advisory services play in farmer's decision making process	1–2

Question 2 (a)

Outcomes assessed: H5.1

MARKING GUIDELINES

Criteria	Marks
• Sketches in general terms a genetic technology and clearly states the potential impact/s on animal production systems	3
• Sketches in general terms a genetic technology that may impact on animal production systems	2
• Identifies a genetic technology that may impact on animal production systems OR • Identifies a possible impact of genetic technology on animal production systems in general	1

Question 2 (b)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Provides the key features of TWO or more components of the method, clearly linking these to how they were used to ensure unbiased results, in a study relating to the use of a current technique/technology in animal production	4
• Provides the key features of ONE component of the method, clearly linking this to how it was used to ensure unbiased results, in a study relating to the use of a current technique/technology in animal production AND identifies a second feature OR • Sketches in general terms at least TWO components of the method used to ensure unbiased results in a study relating to the use of a current technique/technology in animal production	3
• Sketches in general terms at least ONE component of the method used to ensure unbiased results in a study relating to the use of a current technique/technology in animal production OR • Identifies at least TWO aspects of experimental methodology in a study relating to the use of a current technique/technology in animal production OR • Provides the features of ONE component of the method clearly linking to unbiased results	2
• Identifies a study that was undertaken into the use of a current technique/technology in animal production OR • Identifies ONE aspect of experimental methodology that aims to produce unbiased results in experiments in general, without relating to a specific study	1

Question 2 (c)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies features of objective measurement incorporated into an animal breeding program AND • Places a judgement on the value of the use of objective measurement/s in animal breeding against specific criteria	7–8
• Provides some features of objective measurement incorporated into an animal breeding program and places a judgement on the value of objective measurement in animal breeding AND • Provides some features of another objective measurement used in animal breeding program	5–6
• Provides some features of objective measurement incorporated into an animal breeding program and places a judgement on its value OR • Provides features of at least TWO types of objective measurement used in an animal breeding program	3–4
• Identifies TWO types of objective measurements used in animal breeding OR • Sketches in general terms what is meant by objective measurement in animal breeding OR • Identifies a specific animal breeding program	1–2

Question 3 (a)

Outcomes assessed: H5.1

MARKING GUIDELINES

Criteria	Marks
• Sketches in general terms the importance of horticulture and clearly states the effect this has on the Australian economy	3
• Sketches in general terms the importance of horticulture industry to the Australian economy	2
• Identifies an effect of horticulture to the Australian economy	1

Question 3 (b)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Provides the key features of at least TWO or more components of the experimental design, clearly linking these to the role of these in a study relating to a technological innovation in a horticultural industry	4
• Provides the key features of at least ONE component of the experimental design, clearly linking these to the role of these features in a study relating to a technological innovation in a horticultural industry AND identifies another component OR • Sketches in general terms at least TWO components of the experimental design in a study relating to a technological innovation in a horticultural industry	3
• Sketches in general terms at least ONE component of the experimental design in a study relating to a technological innovation in a horticultural industry OR • Identifies at least TWO components of experimental design in a study relating to technological motivation in a horticultural industry OR • Provides the key features of at least ONE component of experimental design	2
• Identifies a study relating to technological innovation in a horticultural industry OR • Identifies ONE aspect of experimental design in experiments in general, without relating to a specific study	1

Question 3 (c)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies practices that result from management decisions within a horticultural system, that aim to address both economic viability and environmental sustainability of that system AND • Places a judgement on the value of management in balancing economic viability and environmental sustainability	7–8
• Identifies at least two practices that result from management decisions within a horticultural system, that aim to address both economic viability and environmental sustainability of that system and places a judgement on the value of one of these	5–6
• Identifies a practice that results from management decisions within a horticultural system, that aims to address either economic viability OR environmental sustainability of that system and places a judgement on the value of management for this OR • Provides the key features of practices that result from management decisions within a horticultural system, that aim to address either economic viability OR environmental sustainability of that system	3–4
• Sketches in general terms ONE management practice used in a horticultural system OR • Identifies ONE or TWO management practices used in a horticultural system	1–2

Question 4 (a)

Outcomes assessed: H5.1

MARKING GUIDELINES

Criteria	Marks
• Sketches in general terms ONE legal or other institutional requirement and clearly states the effects it could have on establishing an alternative system/enterprise/technology	3
• Sketches in general terms ONE legal or other institutional requirement	2
• Identifies ONE legal or other institutional requirement associated with an alternative agricultural system, enterprise or technology	1

Question 4 (b)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Provides the features of TWO or more pieces of information or data, from an identified study that has led to the implementation of an alternative agricultural system or technology	4
• Provides the features of ONE piece of information or data, from an identified study that has led to the implementation of an alternative agricultural system or technology AND identifies one other piece of information OR • Sketches in general terms at least TWO types of information or data from a study that has led to the implementation of an alternative agricultural system or technology	3
• Identifies at least TWO types of information or data, from a study that has led to the implementation of an alternative agricultural system or technology OR • Sketches in general terms at least ONE piece of information or data from a study that has led to the implementation of an alternative agricultural system or technology OR • Provides the features of ONE piece of information or data from an identified study	2
• Identifies a study that has led to the implementation of an alternative agricultural system or technology OR • Identifies ONE piece of information or data from a study that has led to the implementation of an alternative agricultural system or technology	1

Question 4 (c)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies at least TWO factors considered by the farm manager and places a judgement on the value of using that factor	7–8
• Identifies ONE factor considered by the farm manager and places a judgement on the value of using that factor AND • Identifies features of at least ONE other factor considered by the farm manager	5–6
• Identifies ONE factor considered by the farm manager and places a judgement on the value of using that factor OR • Provides key features of at least TWO other factors considered by the farm manager	3–4
• Identifies ONE or TWO factors a farm manager should consider for the successful introduction of an alternative agricultural system or technology	1–2

Question 5 (a)

Outcomes assessed: H5.1

MARKING GUIDELINES

Criteria	Marks
• Sketches in general terms how this method produces new plant genetic material	3
• Sketches in general terms a method used to produce plants	2
• Identifies one method used to produce plants	1

Question 5 (b)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Provides the key features of at least TWO steps/components used to obtain data in a study related to plant breeding or advancing productivity	4
• Provides the key features of ONE step of the method used to obtain data in a study related to plant breeding or advancing plant productivity AND identifies another step of the method OR • Sketches in general terms at least TWO components/steps used to obtain data	3
• Sketches in general terms at least ONE component/step used in the method to obtain data in a study relating to plant breeding or advancing plant productivity OR • Identifies TWO components of experimental methodology used to obtain data in a study relating to plant breeding or advancing plant productivity OR • Provides the key features of ONE step of the method used to obtain data	2
• Identifies ONE component of experimental methodology used to obtain data generally OR • Identifies a study related to a plant breeding or advancing productivity in plant production systems	1

Question 5 (c)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies at least TWO management techniques farm managers can use to optimise water and nutrient uptake and places a judgement on the value of using that management technique	7–8
• Identifies ONE management technique farm managers can use to optimise water and nutrient uptake and places a judgement on the value of that management technique AND • Identifies some features of ONE other technique	5–6
• Identifies ONE management technique used by farm managers and places a judgement on using that technique OR • Provides the key features of at least TWO management techniques used by farm managers	3–4
• Identifies ONE or TWO management techniques farmers can use to optimise water and nutrient uptake in plants OR • Identify ONE plant production system	1–2

Question 6 (a)

Outcomes assessed: H5.1

MARKING GUIDELINES

Criteria	Marks
• Sketches in general terms a procedure recommended to reduce soil degradation clearly stating its effect in alleviating the soil degradation problem	3
• Sketches in general terms a procedure recommended to reduce a soil degradation problem	2
• Identifies a procedure recommended to reduce soil degradation	1

Question 6 (b)

Outcomes assessed: H4.1

MARKING GUIDELINES

Criteria	Marks
• Provides the key features of at least TWO ways used to present data in a study related to efficient use of water in a clear and coherent manner	4
• Provides the key features of ONE way used to present data in a study related to the efficient use of water AND identifies another way data is presented OR • Sketches in general terms at least TWO methods used to present data in a study related to the efficient use of water	3
• Sketches in general terms at least ONE method used to present data in a study relating to the efficient use of water OR • Identifies at least TWO ways data is presented in a study related to the efficient use of water OR • Provides the key features of ONE way used to present data in a study related to efficient water use	2
• Identifies a study related to the efficient use of water OR • Identifies ONE way used to present data generally	1

Question 6 (c)

Outcomes assessed: H3.4

MARKING GUIDELINES

Criteria	Marks
• Identifies of at least TWO land management practices that caused ONE type of soil degradation and places a value judgement on the use of these land management practices	7–8
• Identifies ONE land management practice that caused ONE type of soil degradation and places a judgement on the value of that land management practice AND • Identifies some features of one other land management practice	5–6
• Identifies ONE management practice that cause ONE type of soil degradation and provides a judgement on that practice OR • Provides key features of at least TWO management practices that have caused soil degradation	3–4
• Identifies ONE or TWO practices that have caused a type of soil degradation OR • Identifies ONE soil degradation problem	1–2