

**2002 HSC Notes from  
the Marking Centre  
Agriculture**

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# 2002 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 2002 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 2002 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 2002, 1537 candidates attempted the Agriculture examination.

Teachers and candidates should be aware that examiners may ask questions that address the syllabus outcomes in a manner that requires candidates to respond by integrating their knowledge, understanding and skills developed through studying the course. This reflects the fact that the knowledge, understanding and skills developed through the study of discrete sections, should accumulate to a more comprehensive understanding than may be described in each section separately.

### Paper 1

#### Section I

Generally candidates performed well in this mandatory section which focuses on the farm product study and sustainability issues. Most candidates demonstrated a sound knowledge and understanding of their selected product and their ability to interpret, organise and display data was noted.

Responses reflected a satisfactory understanding of broad agricultural issues; however, depth of knowledge in the areas of 'recent research' and 'the impact on markets' was often lacking. The interpretation of questions in this section was adequate with the majority of candidates responding appropriately to key words. Significant numbers of candidates demonstrated a poor understanding of the term 'discuss'.

### Question 1

- (a) (i) An agribusiness input was correctly identified in most cases.
- (ii) The majority of answers outlined two marketing strategies. Lower scoring responses simply named marketing strategies or selected very similar strategies then failed to distinguish clearly between these.
- (b) Better responses clearly showed how product specifications could be used in an advertising campaign. Clear relationships were drawn and specific examples were used in the best responses. Overall, a number responses lacked examples or failing to draw a link between product specifications and advertising of the product.
- (c) The majority of candidates answered this question well. Higher scoring responses clearly described how problems, both ‘on’ and ‘off’ the farm, made meeting quality specifications difficult. Lower scoring responses were able to identify problems but provided no description.

### Question 2

- (a) This part was answered well in the majority of cases. Full marks were awarded to graphs that were constructed with a heading and depicted accurately plotted data points on correctly orientated and labelled axes. Lower scoring responses were deficient in one or more of the following: heading, labels, unit of measure, orientation, accurate plotting, plotting from zero or extrapolation beyond the given data.
- (b) Many answers scored full marks for this part. This was achieved by identifying and explaining one relevant factor that affects price fluctuations such as demand or disease. Lower scoring responses only identified one relevant factor or failed to clearly show how price fluctuations resulted from the factors given.

### Question 3

- (a) The majority of candidates were able to identify a problem associated with genetically modified (GM) crops. Those that could not identify an appropriate problem demonstrated a lack of understanding of the term, ‘genetically modified’.
- (b) Whilst most candidates were able to identify an appropriate area of scientific research and associated technology, better candidates demonstrated a sound understanding of its impact on either production or marketing.
- (c) Most candidates were able to describe several sustainable practices related to an agricultural system. Better responses discussed the issues, demonstrating the relationship between sustainable practices and profitability. Lower scoring answers lacked depth, rarely utilising the answer space provided and did not provide points for and against in their discussion.

## Section II

### Question 4

- (a) The majority of the candidates were able to describe a practice that would lead to a pesticide resistance problem.
- (b) The majority of the candidates provided evidence of familiarity with the usage information that appears on labels of pesticide containers. Most were able to explain the significance of the piece of information that they identified.
- (c) Lower scoring candidates provided a description of integrated pest management practices, but did not link IPM with the minimisation of problems associated with pesticide use.
- (d) A large number of the candidates were unable to describe the genetic basis of a plant breeding system. This, in turn, impacted on their ability to provide an explanation of how the breeding system benefits plant production. A number of responses did not demonstrate a clear understanding of the concepts being addressed.

### Question 5

- (a) Most respondents were able to identify the oesophagus correctly, but showed little familiarity with the location of the caecum and the duodenum. Better responses were able to correctly label structures in the two digestive tracks.
- (b) Better responses provided a detailed explanation of one similarity and one difference in the way the two systems digest protein. A number of candidates addressed protein synthesis rather than protein digestion in monogastric and ruminant animals.
- (c) The majority of the candidates responded well to this part of this question. Most interpreted the data presented in the table and drew simple conclusions about nutrient retention.

Better responses provided a detailed explanation of the benefits of stubble retention as opposed to removal and burning.

- (d) The majority of the candidates engaged with this question at least at a fundamental level.

Better responses provided a detailed explanation of the importance of minimum tillage and crop rotation in sustainable farming systems. Lower scoring responses described minimum tillage and the process of crop rotation, but did not explain the significance of these practices.

### Section III

Candidates were required to select one extended structured response question from a choice of four in Section III. This section examined all aspects of the course, with a focus on evaluating and assessing management processes in agricultural systems.

Generally candidate performance was satisfactory for part (a) of each question, however, descriptions of key features and characteristics reflected a generalised knowledge of concepts and often lacked depth.

Many responses clearly identified components or described characteristics, but failed to provide adequate argument, summation or judgement on specific issues pertaining to the question. This was necessary to achieve in the higher performance ranges. Better responses clearly ‘assessed’ and ‘evaluated’ as required.

#### Question 6

Approximately 15% of candidates attempted this question.

- (a) The majority of the candidates were able to draw a clear diagram. Some responses failed to highlight microbial and invertebrate involvement. Better responses combined an accurate diagram with a description of at least five microbial and/or invertebrate interactions in the decomposition of organic matter and nitrogen fixing. A number of candidates described the entire nitrogen cycle, rather than addressing the question.
- (b) A significant number of candidates were able to identify three management practices that involved microbes and/or invertebrates, but did not develop their arguments into a critical assessment. Poorer responses outlined practices not related to the nitrogen cycle. Better candidates gave detailed responses that critically assessed the benefits of the management practices.

#### Question 7

Approximately 65% of candidates attempted this question.

- (a) Better candidates clearly articulated what the quality and quantity measurements actually were. Candidates selecting beef as their farm product generally exhibited a good knowledge of quality criteria. Information relating to the quantity of the product could have been more comprehensively addressed by all respondents. Aspects of quantity were not well outlined and hence responses on how to vary management for the future were poor.

Many candidates could have better described how management would adjust and plan for the future in response to information received.

- (b) Most candidates were able to name three strategies which could be used to manage financial pressures that impact on farm businesses. Many used diversification, borrowed finance, contract selling, leased machinery and the use of contractors as examples.

Some responses provided examples which were too similar to be considered as separate strategies eg Gross Margins, Partial Budgets and Whole farm Budgets.



Many responses provided an outline of the strategies and the benefits each would provide, but often did not develop a full evaluation.

A number of candidates seemed to focus on the word ‘manage’ and went on to discuss farm management practices such as drenching, crop rotation and fodder conservation; these responses often did not link to lessening financial pressures.

### **Question 8**

Approximately 6% of candidates attempted this question.

- (a) Most responses indicated a good understanding of the fate of energy in animal nutrition and represented this clearly in diagrammatic form.
- (b) The majority of responses demonstrated a basic understanding of feed requirements for animals but few provided a critical assessment. Some better responses assessed all information on the feed label. A number of responses did not address the requirements of a named animal in both the growing AND adult stages.

### **Question 9**

Approximately 14% of candidates attempted this question.

- (a) High scoring responses described correctly the changes in proportions of muscle, fat and bone. Most responses provided a description of the changes in amounts of muscle, bone and fat rather than the relative proportions of these tissues.
- (b) The majority of responses included identification of three contrasting characteristics of native and introduced plant species but did not relate the characteristics back to their use in pasture management systems.

Responses scoring mid-range marks included a detailed explanation of the contrasting characteristics, but did not assess them in relation to their use in pasture management systems.

The few responses earning maximum marks described in detail three contrasting characteristics and critically assessed how these affect the role of native and introduced species in pasture management systems.

## Paper 2

Candidates were required to attempt two of the six elective questions in this section if they had not presented a Research Project. Approximately 93% of candidates who sat Paper 1 attempted Paper 2. Questions required candidates to focus on an evaluation of issues relating to innovation and to assess experimental techniques, research methods and data analysis through the study of a relevant piece of research conducted in each topic area.

A significant number of responses could have more clearly displayed a thorough understanding of the elective content. Some high scoring responses evaluated or critically assessed information as required. Lower scoring responses provided basic descriptions or discussions.

Better responses showed understanding of ‘methodology, analysis and presentation of research/study findings’. In many cases it was evident that the analysis of an appropriate study or piece of research in each elective area had not been effectively undertaken. Where a piece of research or a study was the basis of a response, an outline of a simple Candidate trial was often included rather than a study relevant to the elective topic.

### Question 1

Approximately 10% of elective candidates attempted this question on Agribusiness.

- (a) Many candidates were able to outline an impact of a large rural business organization on the agricultural industries with which it is involved. Few, however, were able to outline a study’s methodology in any detail. Of these, most were able to list ways in which the study’s findings were presented.
- (b) Most responses identified two advisory services. There was limited explanation of the specific role of the advisory service in the process of considering change by the farmer to their management or farming system.

Most candidates were able to select an agricultural product for which there are overseas markets and described one or two impacts of international markets on the farm business. The evaluation of these impacts on the farm business was poorly handled in most cases.

### Question 2

Approximately 80% of candidates attempted this question on Animal Management.

- (a) The majority of responses consisted of discussion of a current technique /technology which is advancing productivity in animal production systems. Few responses identified a study. Those candidates who were able to identify a study were usually able to link relevant methodology and presentation of results.
- (b) Many responses failed to display an understanding of genetic engineering and provided insufficient detail of the impacts on an animal production system.
- (c) The majority of candidates were able to state two disease management practices but showed limited understanding of them.

The ‘evaluation’ of disease management practices was often limited to a description of the practices without mentioning the positive and negative aspects. Better responses detailed the advantages and disadvantages of the two management practices and made a summative judgement of the value of the practices mentioned.

### Question 3

Approximately 7% of candidates attempted this question relating to Horticulture.

- (a) Most candidates were able to name a technological innovation, however few responses identified a related study or outlined the methodology used. Those that nominated a study were able to clearly describe how and where the results were presented. Too many responses included old technologies as innovations eg the use of grafting and layering in horticulture.
- (b) The majority of candidates could identify two ways in which a nominated horticultural system could be affected by plant responses to environmental conditions such as temperature, frost and disease. Better responses clearly related cause to effect eg splitting of fruit, root rot.
- (c) Most responses to this part were poor. Many candidates did not understand the meaning of the term ‘analyse’. Many responses identified changing markets eg consumer demand for organic products, but could not analyse the relationship to horticultural practices.

### Question 4

Approximately 15% of candidates attempted the Innovation and Diversification question.

- (a) The majority of responses did not identify an appropriate study. Fewer still outlined the study’s methodology and/or presentation of findings.
- (b) Most candidates were able to identify two appropriate examples of technological innovation. Better responses made the relationship between the innovation and the improvement in an agricultural enterprise evident.
- (c) To gain full marks in this part of the question responses needed to provide a full explanation of how research has overcome two challenges in the development of alternative enterprises. Most did not provide sufficient detail in their explanation. Many candidates experienced difficulty in identifying appropriate challenges.

### Question 5

Approximately 25% of candidates attempted this question on Plant Management.

- (a) Very few responses identified a valid study. Most described a plant breeding technique.
- (b) High scoring responses indicated a depth of understanding of the relationship between density, vegetative and reproductive yield ie vegetative yield increases with increasing density to a plateau and reproductive yield increases with increasing density to a maximum and then declines. Better responses also explained what factors had caused the effect.

Some candidates mistakenly described types of interference, such as allelopathy from other species eg weeds, instead of crop/plant density.

- (c) Most responses identified two environmental factors that can be managed to manipulate plant production.

Higher scoring candidates were able to explain a range of strategies that could be used to manage environmental factors and thus manipulate plant production.

Some responses contained descriptions of management and/or modification of plants eg frost resistant plants or planting time, rather than an explanation of the management of the environmental factors in order to improve plant production.

### Question 6

Approximately 64% of candidates attempted this question on Sustainable Management.

- (a) This part was answered poorly by the vast majority of candidates. Few responses identified a research study of an innovative technology or practice. Most responses were a description or explanation of a technology, totally missing the point of the question ie methodology of a study and the presentation of its findings.

Highest scoring responses identified a study done on an innovative technology or practice and then provided a detailed description of the research methodology followed in the study and presentation of the study's results.

- (b) Explanations of ways in which water quality and/or supply are important to sustainable land and resource management were common in most responses.

Higher scoring candidates provided detailed cause and effect relationships regarding water quality and/or supply and sustainable land and resource management.

- (c) Many responses included a list of 2 strategies that can be used to improve sustainability in Agriculture. Few provided any analysis.

Higher scoring responses provided a detailed analysis of the relationship between the named practice and the implications this practice had with respect to sustainability in Agriculture.

### Optional Research Project

Approximately 7% of the 2002 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 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 3 000 – 5 000 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.

Low-scoring 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. Some candidates measured variables that were inappropriate for answering the research question posed. This reflected poor organisation and lack of time in the planning and conduct of the research.

In general, many projects contained poor literature reviews. These reviews were characterised by candidates presenting all the information that they had sourced 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.

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 their research process.

A significant number of candidates did not obtain a large enough number of replicates, particularly when using animals, or sample size when carrying out a survey. These problems often 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.

Many candidates presented poor referencing in their projects. Often web site references were not dated. It should be noted that where a web site provides a window to a publication, the publication should be cited, not the web site.

In the presentation of data, many candidates continue to present discontinuous scales. This makes results look more significant, but is not accurate presentation of data. Where histograms are used, candidates should be encouraged to include standard deviations or standard errors on the graph. The presentation of data should be ethical and unbiased.

Candidates should be encouraged to develop an original research question, and not one very similar to other candidates from their own centre. Journal entries also suggested the ‘recycling’ of project topics from a school’s previous years candidates. This does not help to generate original research. Projects that centred on plants selected for quick growth rather than agricultural importance were all too common and often reflected a late start date for projects. Many projects scoring low to mid-

range marks investigated questions that were extremely simplistic or were obvious in their outcome eg the effect of changing protein levels on animal growth, nitrogen fertiliser effects on plants, comparisons of common products and techniques with well-documented effects, and investigations into the effects of basic inputs.

# Agriculture Paper 1

## 2002 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
<b>Section I</b>			
1 (a) (i)	1	The place of the farm in the wider agribusiness sector	H3.4
1 (a) (ii)	2	The range of marketing strategies available to producers	H3.2
1 (b)	3	The role of advertising and promotion in the marketing of the product and the importance of product specification	H3.2
1 (c)	4	The problems that may occur in meeting market specifications	H3.1
2 (a)	3	Evaluate marketing information, such as a sales report, for a product	H4.1
2 (b)	2	Evaluate marketing information, such as a sales report, for a product	H3.2
3 (a)	1	The impact that scientific research and associated technology has had on agricultural production and marketing	H3.3
3 (b)	4	The impact that scientific research and associated technology has had on agricultural production and marketing	H3.3
3 (c)	5	The tension between sustainability and short term profitability	H1.1
<b>Section II</b>			
4 (a)	2	The problems of pesticides and chemical resistance in target organisms	H2.1
4 (b)	3	The importance of agricultural chemical labels	H2.1
4 (c)	4	The use and potential for integrated pest management	H1.1, H2.1
4 (d)	6	Breeding systems and their genetic basis	H2.1
5 (a)	2	The similarities and differences of ruminants and monogastrics	H2.2
5 (b)	4	The similarities and differences of ruminants and monogastrics	H2.2
5 (c)	3	The role of soil nutrient cycles in Australian Agriculture System	H2.1
5 (d)	6	Sustainable farming practices, including minimum tillage	H2.1
<b>Section III</b>			
6 (a)	5	The role of microbes and invertebrates in the decomposition of organic matter and the fixing of atmospheric nitrogen via their association with legumes	H1.1, H2.2
6 (b)	10	The role of microbes and invertebrates in the decomposition of organic matter and the fixing of atmospheric nitrogen via their association with legumes	H1.1
7 (a)	5	Assessment of the performance of systems and decision-making based on measures of quality and quantity	H3.4

<b>Question</b>	<b>Marks</b>	<b>Content</b>	<b>Syllabus outcomes</b>
7 (b)	10	Financial pressures	H3.4
8 (a)	5	The fate of energy in animal nutrition	H2.2
8 (b)	10	Use of nutritional data to determine the suitability of animal feeds	H2.2
9 (a)	5	The process of growth and development in animals	H2.2
9 (b)	10	The role of native and introduced pasture species	H2.1



## 2002 HSC Agriculture Marking Guidelines Paper 1

### Section 1

#### Question 1 (a) (i)

*Outcomes assessed: H3.4*

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies one input</li> </ul>	1

#### Question 1 (a) (ii)

*Outcomes assessed: H3.2*

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> <li>Indicates the main features of two marketing systems</li> </ul>	2
<ul style="list-style-type: none"> <li>One marketing system only or some detail omitted</li> </ul>	1

#### Question 1 (b)

*Outcomes assessed: H3.2*

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> <li>A detailed explanation of how specification(s) are used in an advertising campaign is given</li> </ul>	3
<ul style="list-style-type: none"> <li>Some explanation of how specification(s) are used in an advertising campaign is provided</li> </ul>	2
<ul style="list-style-type: none"> <li>One specification or an advertising campaign</li> </ul>	1

**Question 1 (c)***Outcomes assessed: H3.1***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>Detailed description of an on-farm and off-farm problem and well related to problems of meeting marketing specifications for each problem</li></ul>	4
<ul style="list-style-type: none"><li>One on-farm and one off-farm problem well described but some detail missing</li></ul>	3
<ul style="list-style-type: none"><li>One on-farm and one off-farm problem named and outlined</li></ul> <p>OR</p> <ul style="list-style-type: none"><li>One problem well described</li></ul>	2
<ul style="list-style-type: none"><li>One problem identified</li></ul>	1

**Question 2 (a)***Outcomes assessed: H4.1***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>A correctly presented and appropriate graph showing that prices fell over time except for a rise in the final year</li><li>Graph should feature with appropriate scales and axes labelled</li></ul>	3
<ul style="list-style-type: none"><li>As for 3 marks with a significant deficiency in presentation</li></ul>	2
<ul style="list-style-type: none"><li>As for 2 marks with additional deficiencies in presentation</li></ul>	1

**Question 2 (b)***Outcomes assessed: H3.2***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>One factor identified and student correctly shows how this leads to price fluctuations</li></ul>	2
<ul style="list-style-type: none"><li>The student identifies one factor but does not show how this leads to price fluctuations</li></ul>	1

**Question 3 (a)***Outcomes assessed: H3.3***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>Correctly identifies one problem of genetically modified crops</li></ul>	1

**Question 3 (b)***Outcomes assessed: H3.3***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Identifies the research and associated technology and explains how it affects production or marketing of the product with detail	4
• Identifies the research and associated technology and explains how it affects production or marketing of the product, some detail is missing	3
• Identifies research and associated technology but the link to production or marketing is not clear	2
• An appropriate example of scientific research and associated technology is identified for a product	1

**Question 3 (c)***Outcomes assessed: H1.1***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• A system is named and the potential compatibility between short-term profitability and sustainability is addressed • Points for and against are explained clearly in detail	5
• The potential compatibility between short-term profitability and sustainability is addressed for an agricultural system	3–4
• A system is named. Some key facts are stated	1–2

**Section II****Question 4 (a)***Outcomes assessed: H2.1***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Identifies two key features (relating to repeated use, dosage and use of the same group)	2
• Identifies one key feature	1

**Question 4 (b)***Outcomes assessed: H2.1***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• One piece of information is identified. • A clear explanation of the importance of this information by linking with consequences	3
• One piece of information is identified. • Limited explanation of the importance of this information	2
• One piece of information is identified	1

**Question 4 (c)***Outcomes assessed: H1.1, H2.1***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Names a system (crop or livestock) and the pest, weed or disease. Several problems associated with pesticide use are named and the way in which IPM avoids these is explained in detail	4
• Names a system and outlines two or more problems associated with pesticide use with a less detailed explanation of how IPM addresses the problem	3
• Names a system and outlines one problem associated with pesticide use with some explanation of how IPM addresses the problem	2
• Names a system and outlines one problem associated with pesticide use	1

**Question 4 (d)**

*Outcomes assessed: H2.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>• The genetic basis is described in detail</li> <li>• Benefits to plant production are described in detail</li> </ul> OR <ul style="list-style-type: none"> <li>• A plant breeding system is briefly outlined</li> <li>• The genetic basis is described in less detail</li> <li>• Benefits to plant production are explained in detail</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• The genetic basis is described in less detail</li> <li>• Benefits to plant production are explained in less detail</li> </ul> OR <ul style="list-style-type: none"> <li>• A plant breeding system is briefly outlined</li> <li>• The genetic basis is described in general terms</li> <li>• Benefits to plant production are explained in less detail</li> </ul> OR <ul style="list-style-type: none"> <li>• A plant breeding system is briefly outlined</li> <li>• The genetic basis or benefits to production are described in detail</li> </ul>	3–4
<ul style="list-style-type: none"> <li>• The genetic basis is briefly described</li> </ul> OR <ul style="list-style-type: none"> <li>• A plant breeding system is briefly outlined</li> </ul>	1–2

**Question 5 (a)**

*Outcomes assessed: H2.2*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>• All least six labels correctly placed on both diagrams</li> </ul>	2
<ul style="list-style-type: none"> <li>• At least three labels correctly placed on both diagrams</li> </ul>	1

**Question 5 (b)**

*Outcomes assessed: H2.2*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>One similarity and one difference in protein digestion between ruminants and monogastrics are identified and accurately explained</li> </ul>	4
<ul style="list-style-type: none"> <li>One similarity and one difference in protein digestion between ruminants and monogastrics are identified and only one accurately explained</li> </ul> OR <ul style="list-style-type: none"> <li>Both are explained less accurately</li> </ul>	3
<ul style="list-style-type: none"> <li>One similarity and one difference in protein digestion between ruminants and monogastrics identified</li> <li>One similarity OR one difference identified and accurately explained</li> </ul>	2
<ul style="list-style-type: none"> <li>One similarity OR one difference is identified</li> </ul>	1

**Question 5 (c)**

*Outcomes assessed: H2.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies the nutrient element content of straw as a key issue and explain that stubble retention will maximise return of these nutrients to the soil and lessen the need for future fertiliser applications</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies the nutrient content of straw as key issue but the argument for stubble retention is not clear</li> </ul>	2
<ul style="list-style-type: none"> <li>Identifies that nutrients are removed when stubble is removed or burnt</li> </ul>	1

**Question 5 (d)**

*Outcomes assessed: H2.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies at least two factors for each practice and explains in detail how they relate to sustainability</li> </ul>	5–6
<ul style="list-style-type: none"> <li>Identifies at least one factor for each practice and explains how each relates to sustainability in general terms</li> </ul>	3–4
<ul style="list-style-type: none"> <li>A factor is identified and outlined</li> </ul>	1–2

### Section III

#### Question 6 (a)

*Outcomes assessed: H1.1, H2.1*

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> <li>Diagram should be clear and accurate</li> <li>A minimum of five components should be shown from the model answer diagram</li> </ul>	5
<ul style="list-style-type: none"> <li>4 of the key steps shown</li> </ul>	4
<ul style="list-style-type: none"> <li>3 of the key steps shown</li> </ul>	3
<ul style="list-style-type: none"> <li>2 of the key steps shown</li> </ul>	2
<ul style="list-style-type: none"> <li>1 only key step shown</li> </ul>	1

#### Question 6 (b)

*Outcomes assessed: H1.1*

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> <li>Three practices related to microbes and invertebrates are identified with a clear assessment of their benefit to production, including the way in which they affect nitrogen availability</li> </ul>	9–10
<ul style="list-style-type: none"> <li>Three practices identified but the critical assessment of one of these is deficient</li> </ul> OR <ul style="list-style-type: none"> <li>Two practices are critically assessed to a high level</li> </ul>	7–8
<ul style="list-style-type: none"> <li>Three practices identified but the assessments are weak</li> </ul>	5–6
<ul style="list-style-type: none"> <li>One or two practices identified and some assessment is attempted</li> </ul>	3–4
<ul style="list-style-type: none"> <li>Names one or two practices only and outlines their roles</li> </ul>	1–2

**Question 7 (a)**

*Outcomes assessed: H3.4*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Outlines relevant aspects of quantity and quality for a specific farm product. Relates in detail how this information can be used in planning for the future</li> </ul>	5
<ul style="list-style-type: none"> <li>• Gives details about quality and quantity</li> <li>• The response links both of these features to improvement in future performance</li> </ul>	4
<ul style="list-style-type: none"> <li>• Response provides information about either quality or quantity but shows how this can be used to improve future performance</li> </ul>	3
<ul style="list-style-type: none"> <li>• Response describes quality or quantity with limited links to future performance</li> </ul>	2
<ul style="list-style-type: none"> <li>• Mentions one quality or one quantity attribute for the product</li> </ul>	1

**Question 7 (b)**

*Outcomes assessed: H3.4*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Three practices identified with a clear explanation and evaluation of the way in which they may be used to manage financial pressures</li> </ul>	9–10
<ul style="list-style-type: none"> <li>• Three practices identified but the explanation and evaluation for one of these is deficient</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Two practices are explained and evaluated fully</li> </ul>	7–8
<ul style="list-style-type: none"> <li>• Three practices identified but the explanations and evaluations are less detailed</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• One or two practices identified and some evaluation is attempted</li> </ul>	3–4
<ul style="list-style-type: none"> <li>• Identifies one or two practices only and outlines these</li> </ul>	1–2

**Question 8 (a)**

*Outcomes assessed: H2.2*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Students describe all of the steps showing the fate of energy in animal nutrition in the correct order</li> </ul>	5
<ul style="list-style-type: none"> <li>• Four of the key steps shown with correct relationships to other steps</li> </ul>	4
<ul style="list-style-type: none"> <li>• Three of the key steps shown with correct relationships to other steps</li> </ul>	3
<ul style="list-style-type: none"> <li>• Two of the key steps shown with correct relationships to other steps</li> </ul>	2
<ul style="list-style-type: none"> <li>• One of the key steps shown</li> </ul>	1



**Question 8 (b)**

*Outcomes assessed: H2.2*

**MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"> <li>All three feed characteristics critically assessed correctly with reference to both stages of the selected animal</li> </ul>	9–10
<ul style="list-style-type: none"> <li>Two feed characteristics are critically assessed correctly for both stages of the animal but that for the third is incomplete or only partially correct</li> </ul>	7–8
<ul style="list-style-type: none"> <li>One of the feed characteristics is critically assessed correctly for both stages of the animal. Two are incomplete or only partially correct</li> </ul>	5–6
<ul style="list-style-type: none"> <li>All three feed characteristics are incompletely assessed or are only partially correct</li> </ul>	3–4
<ul style="list-style-type: none"> <li>One or two feed characteristics are discussed to some degree</li> </ul>	1–2

**Question 9 (a)**

*Outcomes assessed: H2.2*

**MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"> <li>A diagram is included</li> <li>At least two developmental or growth stages are highlighted and their effect on the proportional change of muscle, bone and fat described</li> </ul>	5
<ul style="list-style-type: none"> <li>One developmental or growth stage is highlighted and its effect on the proportional change of muscle, bone and fat described</li> </ul>	4
<ul style="list-style-type: none"> <li>The proportional change of muscle, bone and fat is correctly described</li> <li>Development or growth stages are not included</li> </ul>	3
<ul style="list-style-type: none"> <li>The proportional change of at least two of muscle, bone and fat are correctly described</li> <li>Development or growth stage are not included</li> </ul>	2
<ul style="list-style-type: none"> <li>The proportional change of at least one of the muscle, bone and fat is correctly described</li> <li>Development or growth stage are not included</li> </ul>	1

**Question 9 (b)***Outcomes assessed: H2.1***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"><li>Identifies how three contrasting characteristics of native and introduced plant species affect their role in pasture management systems and assesses them in detail</li></ul>	9-10
<ul style="list-style-type: none"><li>Identifies how three contrasting characteristics of native and introduced plant species affect their role in pasture management systems but only two of these are adequately assessed</li></ul> <p>OR</p> <ul style="list-style-type: none"><li>The roles of two characteristics are assessed to a high degree</li></ul>	7-8
<ul style="list-style-type: none"><li>Identifies how three contrasting characteristics of native and introduced plant species affect their role in pasture management systems but only one of these is adequately assessed</li></ul>	5-6
<ul style="list-style-type: none"><li>Identifies how three contrasting characteristics of native and introduced plant species affect their role in pasture management systems and provides some level of assessment</li></ul>	3-4
<ul style="list-style-type: none"><li>Identifies how one or two contrasting characteristic/s of native and introduced plant species affect their role in pasture management systems</li></ul>	1-2

# Agriculture Paper 2

## 2002 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
1 (a)	3	Analysing a study of the impact of a large rural business organisation on the agricultural industries in which it is involved	H4.1
1 (b)	4	The role of farm advisory services in farm management decision-making	H3.4
1 (c)	8	Evaluating the impact of international markets on farm business	H5.1
2 (a)	3	Analysing a study of a current technique/technology which is advancing productivity in animal production systems	H4.1
2 (b)	4	The impact or potential of genetic engineering	H5.1
2 (c)	8	Advantage and disadvantage of various management practices associated with disease control with emphasis on animal welfare and human safety	H5.1
3 (a)	3	Analysing a study of technological innovation aimed at improving production in a particular horticulture industry	H4.1
3 (b)	4	Discuss how plant physiology and plant response to environment affect production	H3.4
3 (c)	8	Influence of changing markets on production techniques and post-harvest handling in horticulture	H5.1
4 (a)	3	Analysing a study of development and implementation of alternative Agriculture systems	H4.1
4 (b)	4	How technological innovations improve existing agriculture enterprises	H3.4
4 (c)	8	Need for research in development of alternative enterprises	H5.1
5 (a)	3	Analysing a study of the role of plant breeding in production	H4.1
5 (b)	4	How plant density affects vegetative and reproductive yield	H3.4
5 (c)	8	Manage environmental factors to manipulate plant production	H5.1
6 (a)	3	Analysing a study of innovative technology/practices for water use	H4.1
6 (b)	4	Issues related to water quality, supply and regulation	H3.4
6 (c)	8	Analysing strategies/programs related to TCM and whole farm management	H5.1

## 2002 HSC Agriculture Paper 2 Marking Guidelines

### Question 1 (a)

*Outcomes assessed: H4.1*

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies a research study</li> <li>Description of the main features of methodology used to collect research data</li> <li>Description of the way in which findings were presented</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies a research study</li> <li>Describes the study's methodology or presentation</li> </ul>	2
<ul style="list-style-type: none"> <li>Outlines the nature of a research study</li> </ul>	1

### Question 1 (b)

*Outcomes assessed: H3.4*

#### MARKING GUIDELINES

Criteria	Marks
<ul style="list-style-type: none"> <li>Names two advisory services and links the information provided by the services to farm management/farming systems</li> </ul>	4
<ul style="list-style-type: none"> <li>Names two advisory services but does not explain how one of the services aids in decision-making</li> </ul>	3
<ul style="list-style-type: none"> <li>Names two advisory services</li> </ul>	2
OR	
<ul style="list-style-type: none"> <li>Names and explains one advisory service</li> </ul>	
<ul style="list-style-type: none"> <li>Names one advisory service but does not show how this service helps</li> </ul>	1

**Question 1 (c)**

*Outcomes assessed: H5.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>An agricultural product and its overseas markets are identified</li> <li>Two impacts of international markets are named with a thorough evaluation of the effects of both impacts</li> </ul>	7–8
<ul style="list-style-type: none"> <li>An agricultural product and its overseas markets are identified</li> <li>Two impacts of international markets are named with a thorough evaluation of the effects of one of these</li> </ul>	5–6
<ul style="list-style-type: none"> <li>An agricultural product and its overseas markets are identified</li> <li>Two impacts of international markets are named, evaluation of both lacks detail</li> </ul>	3–4
<ul style="list-style-type: none"> <li>An agricultural product and its overseas markets are identified</li> <li>One or two impacts of international markets are outlined</li> </ul>	1–2

**Question 2 (a)**

*Outcomes assessed: H4.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies a research study</li> <li>Description of the main features of methodology used to collect research data</li> <li>Description of the way in which findings were presented</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies a research study</li> <li>Describes the study's methodology or presentation</li> </ul>	2
<ul style="list-style-type: none"> <li>Outlines the nature of a research study</li> </ul>	1

**Question 2 (b)**

*Outcomes assessed: H5.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Two potential impacts of genetic engineering in animal production systems are identified and their impacts are explained in detail</li> </ul>	4
<ul style="list-style-type: none"> <li>Two potential impacts are identified but the impact for only one is explained in detail</li> </ul>	3
<ul style="list-style-type: none"> <li>Two potential impacts are identified</li> </ul>	2
OR	
<ul style="list-style-type: none"> <li>One potential impact is identified and explained</li> </ul>	
<ul style="list-style-type: none"> <li>One potential impact is identified</li> </ul>	1

**Question 2 (c)**

*Outcomes assessed: H5.1*

**MARKING GUIDELINES**

Criteria	Marks
• Two disease management practices are evaluated in detail	7–8
• Two management practices are evaluated but one is less detailed	5–6
• Two management practices are evaluated in limited detail	3–4
• One or two management practices are outlined	1–2

**Question 3 (a)**

*Outcomes assessed: H4.1*

**MARKING GUIDELINES**

Criteria	Marks
• Identifies a research study	3
• Description of the main features of methodology used to collect research data	
• Description of the way in which findings were presented	
• Identifies a research study	2
• Describes the study's methodology or presentation	
• Outlines the nature of a research study	1

**Question 3 (b)**

*Outcomes assessed: H3.4*

**MARKING GUIDELINES**

Criteria	Marks
• Two ways in which a plant production cycle is affected by plant response to the environment are explained in detail	4
• Two ways in which a plant production cycle is affected are identified but only one is explained	3
• Two ways in which a plant production cycle is affected are identified	2
OR	
• One way is identified and explained	1
• One way in which a plant production system is affected is identified	

**Question 3 (c)**

*Outcomes assessed: H5.1*

**MARKING GUIDELINES**

Criteria	Marks
• Two influences of changing markets are analysed in detail	7–8
• Two influences of changing markets are analysed but one analysis is less detailed	5–6
• Two influences of changing markets are analysed but both lack detail	3–4
• One or two influences are outlined	1–2

**Question 4 (a)**

*Outcomes assessed: H4.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Identifies a research study</li> <li>• Description of the main features of methodology used to collect research data</li> <li>• Description of the way in which findings were presented</li> </ul>	3
<ul style="list-style-type: none"> <li>• Identifies a research study</li> <li>• Describes the study's methodology or presentation</li> </ul>	2
<ul style="list-style-type: none"> <li>• Outlines the nature of a research study</li> </ul>	1

**Question 4 (b)**

*Outcomes assessed: H3.4*

**MARKING GUIDELINES**

Criteria	Marks
• Two appropriate examples are identified and a full explanation of how these technological innovations can help improve an agricultural enterprise is given	4
• As above but the explanation for one lacks detail	3
• Two appropriate examples are identified but neither is adequately explained	2
OR	
• One example is given and adequately explained	
• One appropriate example is identified	1

**Question 4 (c)**

*Outcomes assessed: H5.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Two challenges are identified and a full explanation is given of how research has addressed these and allowed for the development of alternative enterprises</li> </ul>	7–8
<ul style="list-style-type: none"> <li>Two challenges are identified but the explanation for one of these is deficient</li> </ul>	5–6
<ul style="list-style-type: none"> <li>Two challenges are identified but neither is fully explained</li> </ul>	3–4
<ul style="list-style-type: none"> <li>One or two challenges are outlined</li> </ul>	1–2

**Question 5 (a)**

*Outcomes assessed: H4.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies a research study</li> <li>Description of the main features of methodology used to collect research data</li> <li>Description of the way in which findings were presented</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies a research study</li> <li>Describes the study's methodology or presentation</li> </ul>	2
<ul style="list-style-type: none"> <li>Outlines the nature of a research study</li> </ul>	1

**Question 5 (b)**

*Outcomes assessed: H3.4*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Two appropriate examples are identified and a full explanation of two effects of plant density on vegetative or reproductive yield are given</li> </ul>	4
<ul style="list-style-type: none"> <li>As above, but the explanation for one is deficient</li> </ul>	3
<ul style="list-style-type: none"> <li>Two appropriate examples are identified but neither is adequately explained</li> </ul>	2
OR	
<ul style="list-style-type: none"> <li>One example is given and adequately explained</li> </ul>	
<ul style="list-style-type: none"> <li>One appropriate example is identified</li> </ul>	1



**Question 5 (c)**

*Outcomes assessed: H5.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Two environmental factors are identified and a full explanation is given as to how these environmental factors can be managed to manipulate plant production</li> </ul>	7-8
<ul style="list-style-type: none"> <li>Two environmental factors are identified but the explanation for one of these is deficient</li> </ul>	5-6
<ul style="list-style-type: none"> <li>Two environmental factors are identified but neither is fully explained</li> </ul>	3-4
<ul style="list-style-type: none"> <li>One or two of the environmental factors are outlined</li> </ul>	1-2

**Question 6 (a)**

*Outcomes assessed: H4.1*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies a research study</li> <li>Description of the main features of methodology used to collect research data</li> <li>Description of the way in which findings were presented</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies a research study</li> <li>Describes the study's methodology or presentation</li> </ul>	2
<ul style="list-style-type: none"> <li>Outlines the nature of a research study</li> </ul>	1

**Question 6 (b)**

*Outcomes assessed: H3.4*

**MARKING GUIDELINES**

Criteria	Marks
<ul style="list-style-type: none"> <li>Two ways in which water quality and/or water supply are important issues in sustainable land and resource management are explained</li> </ul>	4
<ul style="list-style-type: none"> <li>As above, but the explanation for one is deficient</li> </ul>	3
<ul style="list-style-type: none"> <li>Two appropriate ways are identified but neither is adequately explained</li> </ul> OR <ul style="list-style-type: none"> <li>One example is given and adequately explained</li> </ul>	2
<ul style="list-style-type: none"> <li>One appropriate way is identified</li> </ul>	1

**Question 6 (c)***Outcomes assessed: H5.1***MARKING GUIDELINES**

<b>Criteria</b>	<b>Marks</b>
• Two strategies are identified with a full analysis of how they improve sustainability	7–8
• Two strategies are identified but the analysis of the contribution to sustainability of one of these is deficient	5–6
• Two strategies are identified but neither is fully analysed	3–4
• One or two strategies are outlined	1–2