

Agriculture

Sample HSC Examination Questions

From 2011 and beyond, the HSC examination in Agriculture will consist of one 3-hour written examination worth 100 marks. The Agriculture HSC examination specifications can be found in *Assessment and Reporting in Agriculture* at: http://www.boardofstudies.nsw.edu.au/syllabus_hsc/agriculture.html

The paper consists of two sections: Section I examines the core content, and Section II examines the Electives.

The following sample questions provide examples of some Section I and Section II questions that may be set in HSC examinations for Agriculture. A mapping grid is included showing how each sample question relates to syllabus outcomes and content. The mapping grid also shows the targeted performance bands for each item, indicating the level of difficulty of the item. Answers for the objective response questions and marking guidelines for the short-answer and extended response questions are also provided. The marking guidelines indicate the criteria associated with each mark or mark range.

Rubrics indicating general criteria for judging performance for extended response questions have been placed at the beginning of the Section II questions, to indicate the criteria that will be used to assess responses to the questions. These criteria are in addition to criteria specific to each question.

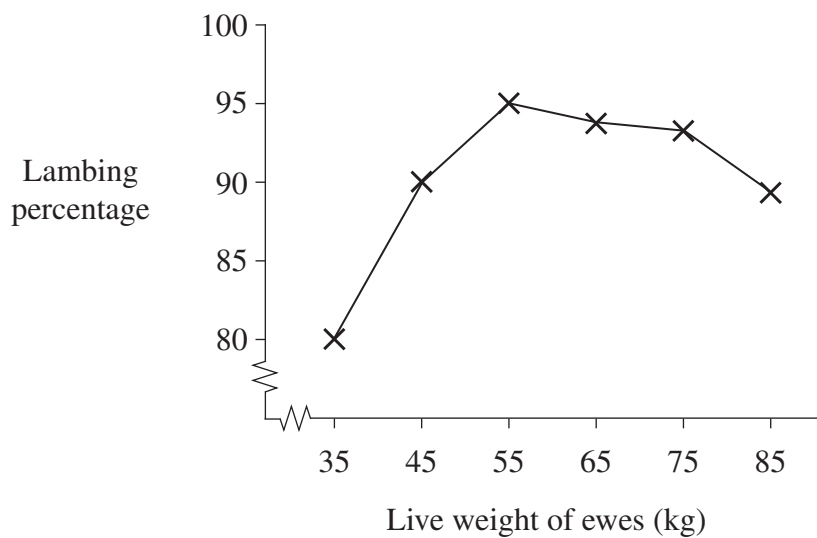
The sample questions and marking guidelines provide teachers and students with guidance as to the sort of questions to expect and how they may be marked. They are not meant to be prescriptive. Each year the structure of the examination will be as prescribed in the examination specifications. However, the number and type of questions in the examination may focus on different syllabus outcomes and content, or have a different range and balance than those given in this sample set of questions.

Section I – Part A

1 How many stomachs do ruminant animals such as cattle and sheep have?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

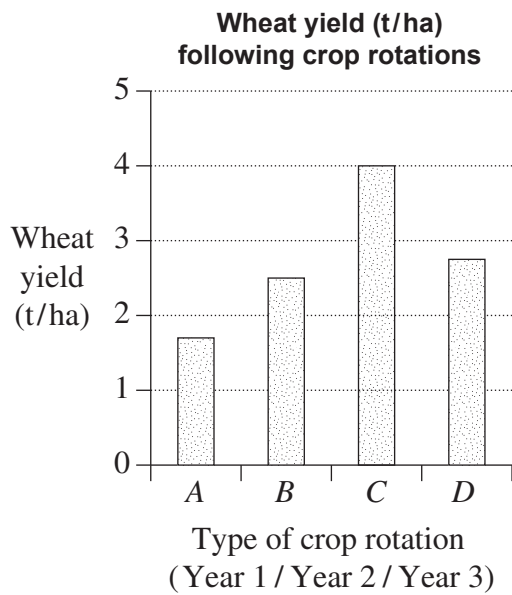
2 The graph shows the live weight of merino ewes (kg) at the time of lambing and the lambing percentage.



Which of the following statements is supported by the data in the graph?

- (A) The weight of ewes has no effect on lambing percentage.
- (B) Ewes weighing less than 45 kg have the highest lambing percentage.
- (C) Ewes weighing more than 85 kg have the highest lambing percentage.
- (D) Ewes weighing between 55 and 75 kg have the highest lambing percentage.

- 3 The graph shows the wheat yield (t/ha) in the final year for four different types of three-year crop rotation.



	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>
<i>A</i>	Wheat	Wheat	Wheat
<i>B</i>	Canola	Wheat	Wheat
<i>C</i>	Wheat	Canola	Wheat
<i>D</i>	Chickpea	Wheat	Wheat

Which crop rotation resulted in the highest yield in its final year?

- (A) *A*
- (B) *B*
- (C) *C*
- (D) *D*

- 4 A farmer conducted a trial to determine the effect of three different feed types on the final weight of pigs.

Fifteen pigs with the same weight were chosen and randomly divided into three equal groups and placed in different pens. Each group was fed a different type of feed.

The final weight of each pig is shown.

	<i>Final Weight (kg)</i>					<i>Mean final weight (kg)</i>	<i>Standard deviation (kg)</i>
Pen 1 Feed X	102	113	105	111	109	108.0	4.4
Pen 2 Feed Y	107	97	104	112	106	105.2	5.4
Pen 3 Feed Z	100	107	100	113	109	105.8	5.7

Based on the results of the trial, which type of feed should be selected, and why?

- (A) Feed X, because it gives the highest mean weight and lowest standard deviation
- (B) Feed Y, because it has the highest mean weight and lowest standard deviation
- (C) Feed Z, because it has the lowest mean weight and highest standard deviation
- (D) Feed Y or Z, because they produce similar results

5 The table shows information for Crop A.

	<i>Crop A</i>
Yield (t/ha)	4
Price received (\$/t)	150
Chemical and fuel costs (\$/ha)	85
Shire council rates (\$/annum)	7 000
Seed costs (\$/ha)	35
Fertiliser costs (\$/ha)	50
Bank interest charges (\$/annum)	10 000

What is the gross margin for Crop A?

- (A) \$430
 - (B) \$515
 - (C) \$600
 - (D) \$770
- 6 Which of the following properties of a soil is determined by the relative proportion of sand, silt and clay?
- (A) Porosity
 - (B) Structure
 - (C) Texture
 - (D) Bulk density
- 7 Horticulturists often use a product called rooting powder or gel to stimulate cuttings to produce roots.

What type of plant hormone is found in this product?

- (A) Abscisic acid
- (B) Auxin
- (C) Cytokinin
- (D) Ethylene

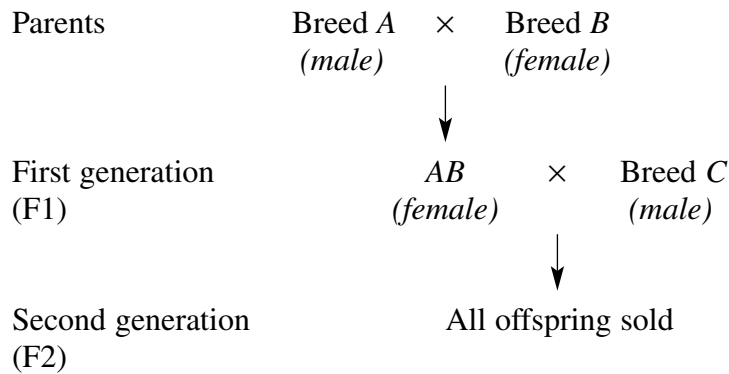
Multiple Choice Answer Key

Sample	Answer
1	D
2	D
3	C
4	A
5	C
6	D
7	B

Section I – Part B

Sample 8 (a) (i) (1 mark)

This diagram shows a type of breeding system that can be used in animal production systems.



What type of breeding system is this?

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Criteria	Marks
• Identifies the type of breeding system	1

Sample 8 (a) (ii) (2 marks)

Outline a reason for using this type of breeding system in animal production.

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Criteria	Marks
• Sketches in general terms a reason for using the type of breeding system in animal production	2
• Identifies a reason for using a breeding system	1

Sample 8 (b) (4 marks)

Explain why a farmer might use an alternative breeding system to the one shown.

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Criteria	Marks
<ul style="list-style-type: none">• Provides an alternative breeding system and a detailed account of the benefit(s) of this system and why a farmer may use it	4
<ul style="list-style-type: none">• Outlines an alternative breeding system and provides a benefit of this system	3
<ul style="list-style-type: none">• Outlines alternative breeding system OR <ul style="list-style-type: none">• Outlines reason for using an alternative breeding system	2
<ul style="list-style-type: none">• Identifies an alternative breeding system OR <ul style="list-style-type: none">• Identifies a reason for using an alternative breeding system	1

Sample 9 (6 marks)

Explain the role of hormones in the regulation of animal reproduction and behaviour.

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Criteria	Marks
<ul style="list-style-type: none">Shows the relationship between the role of hormones in the regulation of animal reproduction and behaviour	5–6
<ul style="list-style-type: none">Outlines how hormones regulate animal reproduction and behaviour OR <ul style="list-style-type: none">Shows the relationship between the role of hormone/s in the regulation of animal reproduction or animal behaviour	3–4
<ul style="list-style-type: none">Outlines the role of hormone/s in the regulation of animal reproduction and/or behaviour OR <ul style="list-style-type: none">Identifies the role of hormones in the regulation of animal reproduction and behaviour	1–2

Sample 10 (a) (i) (2 marks)

Name a farm product.

Farm product:

For the farm product named, describe ONE measure used to assess the quality of this product.

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Criteria	Marks
• Provides features and characteristics of a measure used to assess the quality of the named product	2
• Outlines a measure used to assess the quality of a farm product	1

Sample 10 (a) (ii) (2 marks)

Explain ONE way that the quality of this product can be improved.

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Criteria	Marks
• Shows clearly how the quality of the farmed product named can be improved	2
• Describes a way the quality of a farm product can be improved	1

Sample 10 (b) (2 marks)

Describe ONE way in which the product named can be marketed.

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Criteria	Marks
• Provides features and characteristics of a way that the product named can be marketed	2
• Identifies a way that the product named can be marketed	1

Sample 10 (c) (4 marks)

Explain the role of advertising and promotion in the marketing of this product. Use an example in your answer.

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Criteria	Marks
<ul style="list-style-type: none">• Outlines the role of advertising and promotion and relates this to an effect on the marketing of this product, with the use of an example	4
<ul style="list-style-type: none">• Outlines the role of advertising and promotions in the marketing of this product, with the use of examples	3
<ul style="list-style-type: none">• Outlines an example of advertising and promotion that may be used OR <ul style="list-style-type: none">• Outlines the role of advertising and promotion	2
<ul style="list-style-type: none">• Identifies an example of advertising that can be used OR <ul style="list-style-type: none">• Identifies an example of promotion that can be used	1

Section II

In your answers you will be assessed on how well you:

- demonstrate knowledge and understanding relevant to the question
 - communicate ideas and information using relevant examples
 - present a logical and cohesive response
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Agri-food, Fibre and Fuel Technologies

Sample 11 (a) (i) (2 marks)

Outline how biofuels can be produced from agriculturally produced sources.

Criteria	Marks
<ul style="list-style-type: none">• Sketches in general terms how biofuels can be produced from agriculturally produced sources	2
<ul style="list-style-type: none">• Identifies a method of how biofuels can be produced OR <ul style="list-style-type: none">• Outlines biofuels	1

Sample 11 (a) (ii) (6 marks)

Describe the issues related to the production of biofuels.

Criteria	Marks
<ul style="list-style-type: none">• Provides features and characteristics of the issues related to the production of biofuels	5–6
<ul style="list-style-type: none">• Outlines issues related to the production of biofuels OR <ul style="list-style-type: none">• Describes an issue related to the production of biofuels	3–4
<ul style="list-style-type: none">• Outlines issues related to the biofuels OR <ul style="list-style-type: none">• Provides some relevant information	1–2

Sample 12 (12 marks)

Assess the impact of gene technology applications on agricultural production.

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates a thorough knowledge and understanding of gene technology applications• Describes the impact of gene technology applications on agricultural production• Makes a detailed judgement of the impact of gene technology on agricultural production• Provides relevant examples that support the response• Effectively communicates ideas in a logical and cohesive manner	10–12
<ul style="list-style-type: none">• Demonstrates a sound knowledge and understanding of gene technology applications• Explains the impact of gene technology application on the agricultural production• Provides relevant examples• Communicates ideas in an organised manner	7–9
<ul style="list-style-type: none">• Demonstrates a basic knowledge of gene technology application• Outlines gene technology• Uses narrow examples• Communicates ideas in a basic form	4–6
<ul style="list-style-type: none">• Demonstrates limited knowledge of gene technology• Communicates simple ideas	1–3

OR

Climate Challenge

Sample 13 (a) (i) (3 marks)

Describe ONE way in which long-term climate variation can be investigated.

Criteria	Marks
• Provides features and characteristics of a way that long-term climate variation can be investigated	2–3
• Provides some relevant information	1

Sample 13 (a) (ii) (5 marks)

How have crop yields in Australia varied in relation to changes in the Southern Oscillation Index?

Criteria	Marks
• Clearly shows the relationship between variations in crop yields in Australia and changes in the Southern Oscillation Index	4–5
• Describes variations in crop yields and the Southern Oscillation Index	2–3
• Provides some relevant information	1

Sample 14 (12 marks)

Evaluate issues related to water storage and trading such as river flows, aquifer depletion and enterprise change.

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates a thorough knowledge and understanding of issues related to water storage and trading such as river flows, aquifer depletion and enterprise change• Describes a range of management options• Provides a detailed judgement of the management options• Provides relevant examples that support the response• Effectively communicates ideas in a logical and cohesive manner	10–12
<ul style="list-style-type: none">• Demonstrates a sound knowledge and understanding of issues related to water storage and trading such as river flows, aquifer depletion and enterprise change• Explains the use of a management option in response to climate variability• Provides relevant examples• Communicates ideas in an organised manner	7–9
<ul style="list-style-type: none">• Demonstrates a basic knowledge of the issues related to water storage and trading such as river flows, aquifer depletion and enterprise change• Uses narrow examples• Communicates ideas in a basic form	4–6
<ul style="list-style-type: none">• Demonstrates limited knowledge of the issues related to water storage and trading• Communicates simple ideas	1–3

OR

Farming for the 21st Century

Sample 15 (8 marks)

Describe the research design, data analysis, presentation, conclusion and recommendations of a study carried out to investigate the development or implementation of a recent agricultural technology.

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates a thorough knowledge and understanding of a study carried out to investigate the development or implementations of a recent agricultural technology• Provides features and characteristics of the research design, data analysis, presentation, conclusions and recommendations• Provides relevant examples that support the response• Effectively communicates ideas in a logical and cohesive manner	7–8
<ul style="list-style-type: none">• Demonstrates a sound knowledge and understanding of a study carried out to investigate a recent agricultural technology• Provides an outline of the research design, data analysis, presentation, conclusions and recommendations• Provides relevant examples• Communicates ideas in an organised manner	5–6
<ul style="list-style-type: none">• Demonstrates a basic knowledge of a study to investigate a recent agricultural technology• Presents some information about the research design/data analysis/presentation/conclusions and recommendations• Uses narrow examples• Communicates ideas in a basic form	3–4
<ul style="list-style-type: none">• Demonstrates limited knowledge of a study to investigate an agricultural technology• Communicates simple ideas	1–2

Sample 16 (12 marks)

Evaluate the impact of a recent agricultural technological development in terms of economic, environmental and managerial factors.

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates a thorough knowledge and understanding of the impact of recent agricultural developments in terms of economic, environmental and managerial factors• Describes the impact of the agricultural technological development• Makes a detailed judgement of the impact• Provides relevant examples that support the response• Effectively communicates ideas in a logical and cohesive manner	10–12
<ul style="list-style-type: none">• Demonstrates a sound knowledge and understanding of the impact of recent agricultural development• Explains the impact of the agricultural technological development• Provides relevant examples• Communicates ideas in an organised manner	7–9
<ul style="list-style-type: none">• Demonstrates a basic knowledge of some agricultural developments• Outlines the agricultural development in terms of economic/environmental/managerial factors• Uses narrow examples• Communicates ideas in a basic form	4–6
<ul style="list-style-type: none">• Demonstrates limited knowledge of agricultural developments• Communicates simple ideas	1–3

End of sample questions

Agriculture

Sample HSC Questions Mapping Grid

For each sample item, the grid shows the marks allocated, the syllabus content and syllabus outcomes it relates to, and the bands on the performance scale it is targeting. The range of bands shown indicates the performance candidates may be able to demonstrate in their responses. For example, if an item is shown as targeting Bands 3–5, it indicates that candidates who demonstrate performance equivalent to the Band 3 description should be able to score some marks on the item, while those who perform at Band 5 or above could reasonably be expected to gain high marks. In the case of one-mark items, candidates who demonstrate performance at or above the bands shown generally could be expected to answer the item correctly.

Sample	Marks	Content	Syllabus outcomes	Targeted performance bands
Section I Part A sample questions				
1	1	Monogastric and ruminant digestion	H2.2	2–3
2	1	Collection and analysis of data	H4.1	3–4
3	1	Collection and analysis of data	H4.1	2–3
4	1	Collection and analysis of data	H4.1	4–5
5	1	Impact of financial pressures on farmers	H3.1	4–5
6	1	Characteristics of soil	H1.1	2–3
7	1	Role of plant hormone	H2.1	4–5
Section I, Part B sample questions				
8 (a) (i)	1	Breeding systems and their genetic bases to improve quality and production of animals	H2.2	3–4
8 (a) (ii)	2	Breeding systems and their genetic bases to improve quality and production of animals	H2.2	3–4
8 (b)	4	Breeding systems and their genetic bases to improve quality and production of animals	H2.2	3–6
9	6	Role of hormones in regulation of animal production	H2.2	2–6
10 (a) (i)	2	Quantity and quality criteria for a product	H3.1	2–4
10 (a) (ii)	2	Quantity and quality criteria for a product	H3.1	3–5
10 (b)	2	Explain the marketing chain for a product	H3.2, H3.3	2–4
10 (c)	4	Role of advertising, promotion and marketing of product	H3.1	3–6

Section II Electives sample questions				
Agri-food, Fibre and Fuel Technologies				
11 (a) (i)	2	Describe biofuel production	H3.4	2–4
11 (a) (ii)	6	Discuss ethical concerns and controversy surrounding the use of biotechnology in agricultural production	H5.1	2–6
12	12	A wider range of potential applications	H3.4	2–6
Climate Challenge				
13 (a) (i)	3	Investigate Australia’s variable climate	H5.1	2–4
13 (a) (ii)	5	Analyse causes of climate variability	H5.1	2–6
14	12	Evaluate a range of management options available to the farmer to manage climate variability	H3.4	2–6
Farming for the 21st Century				
15	8	Analyse research into technical development	H4.1	2–6
16	12	Evaluate adopting a technological development	H3.4, H5.1	2–6
