

2016 HSC Agriculture Marking Guidelines

Section I, Part A

Multiple-choice Answer Key

Question	Answer
1	A
2	A
3	D
4	D
5	C
6	D
7	B
8	A
9	C
10	C
11	D
12	B
13	C
14	A
15	B
16	C
17	B
18	C
19	B
20	C

Section I, Part B

Question 21 (a)

Criteria	Marks
<ul style="list-style-type: none"> Makes a link between the factor in the diet and why it makes it more suitable for ruminants 	2
<ul style="list-style-type: none"> Identifies a factor in a diet which makes it more suitable for ruminants 	1

Sample answer:

Feed A – it is higher in fibre, which is necessary for rumination.

Question 21 (b)

Criteria	Marks
<ul style="list-style-type: none"> Provides a clear reason for the protein level required at TWO stages in an animal's life 	4
<ul style="list-style-type: none"> Provides a clear reason for the protein level required at ONE stage in an animal's life 	3
<ul style="list-style-type: none"> States the protein needs of an animal at TWO stages in its life without giving reasons <p>OR</p> <ul style="list-style-type: none"> Provides a basic reason for protein level at ONE stage in an animal's life 	2
<ul style="list-style-type: none"> Provides a relevant point 	1

Sample answer:

Early in life a beef calf needs a higher protein content in its diet to allow it to grow muscle tissue and develop. At maturity it requires less protein as its muscle development is almost complete.

Question 22 (a)

Criteria	Marks
<ul style="list-style-type: none"> Describes in detail TWO techniques that can be used to maintain or increase soil organic matter levels 	4
<ul style="list-style-type: none"> Describes in detail ONE technique that can be used to maintain or increase soil organic matter levels OR <ul style="list-style-type: none"> Outlines TWO techniques that can be used to maintain or increase soil organic matter levels 	3
<ul style="list-style-type: none"> Outlines a technique that can be used to maintain or increase soil organic matter levels 	2
<ul style="list-style-type: none"> Identifies a technique that can be used to maintain or improve soil organic matter levels 	1

Sample answer:

A pasture ley phase in a cropping system will add plant material in the form of dead leaves, stems and roots. When the pasture is grazed, organic matter is added to the soil via manure. The level of soil organic matter builds up over time if the soil is left undisturbed.

Litter from poultry sheds or bedding from livestock sheds includes materials such as straw, manure, wood shavings and rice hulls. When added to soils, either in raw form or after being composted, they decompose and add organic matter to the soil.

Answers could include:

- Green manure crops
- Minimum tillage
- Zero tillage
- Stubble retention.

Question 22 (b)

Criteria	Marks
<ul style="list-style-type: none"> Names and describes a soil/water conservation program that involves government and community groups 	3
<ul style="list-style-type: none"> Outlines a soil/water conservation program 	2
<ul style="list-style-type: none"> Identifies a soil/water conservation program or strategy 	1

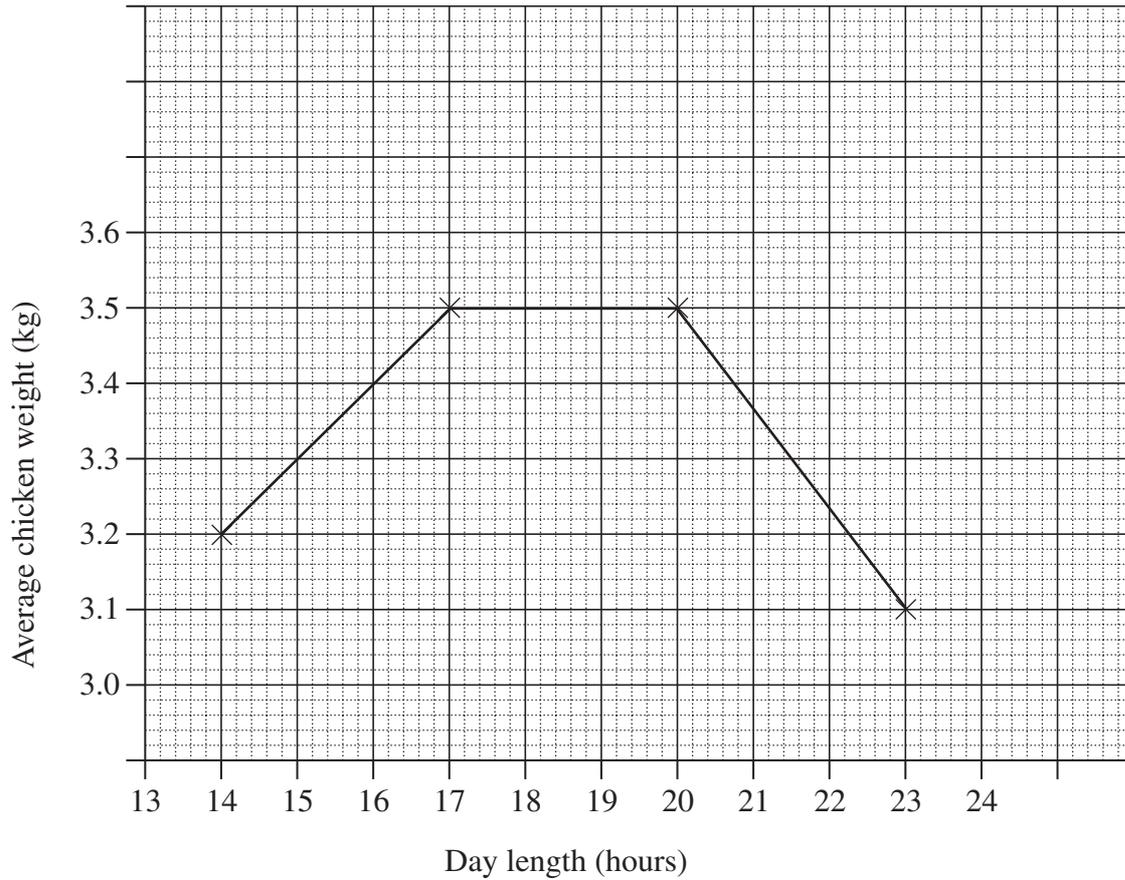
Sample answer:

Landcare is an organisation where community landcare groups identify a significant environmental problem, such as salinity or soil erosion, and set out to rectify it. This community initiative is supported by government funding which allows for the purchase of materials and equipment required to complete projects such as bush regeneration, tree planting and erosion control.

Question 23 (a)

Criteria	Marks
• Axes labelled and scaled correctly, data correctly plotted and day length on x-axis	3
• Any two of: data plotted correctly, axes labelled correctly, axes scaled correctly	2
• Axes labelled correctly OR axes scaled correctly OR data plotted correctly	1

Sample answer:



Question 23 (b)

Criteria	Marks
• Only FOUR correct features identified	4
• Only THREE features identified OR • FOUR correct and ONE incorrect feature identified	3
• Only TWO correct features identified	2
• ONE correct feature identified	1

Sample answer:

- Similar sheds
- Industry standard stocking rate
- 5000 chickens per shed
- Chickens in each shed received the same diet

Question 23 (c)

Criteria	Marks
• 17 hours and justified on the basis of highest weight AND lower input costs	3
• Any number in the range 17–20 with a justification	2
• Any number in the range 17–20 without any justification	1

Sample answer:

Seventeen hours of daylight would be recommended because it results in the highest body weight and uses less electricity for lighting, thus reducing costs.

Question 24 (a)

Criteria	Marks
• Identifies TWO sources of competition	2
• Identifies ONE source of competition	1

Sample answer:

Two sources of competition in crops are weeds and other crop plants.

Question 24 (b)

Criteria	Marks
• Identifies a strategy used to reduce competition AND links it to the availability of plant resources	3
• Identifies a strategy used to reduce competition AND links it to the availability of a plant resource	2
• Identifies a strategy used to reduce competition	1

Sample answer:

Competition in crops can be managed by spraying with a herbicide to control weeds. This results in increased availability of nutrients, water and light for the crop.

Answers could include:

- modifying plant density/spacing
- inter-row cultivation
- other relevant weed control techniques.

Question 24 (c)

Criteria	Marks
• Provides clear reasons as to how named management practices maximise photosynthesis	6
• Explains in general terms how named management practices maximise photosynthesis	4–5
• Outlines a management practice/s without linking to how it/they maximise(s) photosynthesis	2–3
• Identifies a relevant management practice	1

Sample answer:

Cotton is grown in areas of NSW where rainfall is limited but the soils and topography suit the crop. Irrigation is used to supply water to the plants. This allows them to photosynthesise at a high rate and produce high yielding crops because water is a basic photosynthetic input.

The row spacing affects the amount of light penetrating to the lower leaves of the crop plants.

Appropriate spacing will allow the maximum number of plants and allow enough light to penetrate to the lower leaves, thus maximising photosynthesis.

Answers could include:

- Use of glasshouses (temperature, light, CO₂)
- Application of fertilisers (related to chlorophyll production)
- Weed control (applied to relevant examples)
- Row direction
- Leaf pest/disease control
- Variety selection.

Question 25

Criteria	Marks
<ul style="list-style-type: none"> Describes in detail ways that stress and/or harm are reduced when performing each of TWO named animal husbandry practices 	6
<ul style="list-style-type: none"> Describes ways that stress and/or harm can be minimised when performing an animal husbandry practice AND describes a way stress and/or harm can be minimised for a second practice OR <ul style="list-style-type: none"> Describes a way of reducing stress and/or harm for each of TWO animal husbandry practices 	4–5
<ul style="list-style-type: none"> Describes ways that stress and/or harm are reduced when performing an animal husbandry practice OR <ul style="list-style-type: none"> Describes a way that stress and/or harm are reduced when performing an animal husbandry practice 	2–3
<ul style="list-style-type: none"> Identifies animal husbandry practice/s which can stress or harm the animal 	1

Sample answer:

To minimise stress and reduce harm associated with lamb marking:

- Lambs should be marked before six weeks of age due to legislative requirements
- Marking should be done in the morning when it is cool and to allow plenty of time for lambs and their mothers to be reunited
- Marking should be performed in clean yards where possible to reduce the risk of infection.

When mustering sheep stress and harm can be minimised by:

- having good fences and wide gates in corners of paddocks to enable smooth flow of stock
- moving sheep slowly and quietly with minimal use of dogs.

Question 26 (a)

Criteria	Marks
<ul style="list-style-type: none"> Outlines an example of an advertising or promotional campaign 	2
<ul style="list-style-type: none"> Identifies an example of a promotional campaign 	1

Sample answer:

Posters and leaflets featuring recipes and ideas for using lamb in cooking are often on display in retail outlets such as butcher shops and supermarkets in order to encourage consumers to purchase lamb rather than another type of meat.

Question 26 (b)

Criteria	Marks
• Clearly links TWO market specifications and their purposes	4
• Identifies TWO market specifications but only clearly links ONE to its purpose	3
• Identifies TWO market specifications	2
• Identifies ONE market specification	1

Sample answer:

Farm product: Prime lamb

For the domestic Australian market lamb carcasses should have weight of 20–22 kg so as to produce meat cuts suitable for Australian consumers. A fat score of 3 is desirable to ensure tenderness and minimise wastage.

Question 26 (c)

Criteria	Marks
• Provides clear links between TWO management strategies and their impact on product quality	6
• Provides some links between TWO management strategies and their impact on product quality OR • Provides clear links between a management strategy AND identifies another strategy	4–5
• Provides clear links between a management strategy and the impact it has on product quality OR • Outlines a strategy which could be used to improve product quality	2–3
• Identifies a strategy that could be used to improve product quality	1

Sample answer:

Maintaining high levels of nutrition for lactating ewes ensures that their milk production will be high. This strategy leads to fast-growing lambs that will have tender meat, a suitable carcass weight and a desirable fat content.

Using high quality terminal sires to cross with other breeds of ewe results in hybrid vigour, which results in improved growth rates and desirable carcass weight and composition.

Answers could include:

- Drenching of ewes and lambs
- Castration of male lambs
- Leaving male lambs as cryptorchids
- Lot feeding of lambs.

Question 27 (a)

Criteria	Marks
• Provides TWO benefits of vertical integration and uses a specific example	4
• Provides ONE benefit of vertical integration and uses a specific example OR provides TWO benefits without using a specific example	3
• Provides a benefit of vertical integration	2
• Makes a relevant point about vertical integration	1

Sample answer:

The supply and marketing of Saltbush Lamb in NSW is an example of vertical integration on a small scale. The farm owner is responsible for the production of the lamb, its processing into carcasses and the ultimate sale of the product via farmers' markets and online sales. The benefits to the farmer of this include a reduction in transport and marketing costs due to the by-passing of wholesalers and processors, control of the price at which the product is sold and receiving first-hand consumer feedback from customers thus allowing for changes in production to meet consumers' expectations.

Question 27 (b)

Criteria	Marks
• Provides a clear link between an increase in demand and financial decisions made by farmers	4
• Makes some connection between an increase in demand and a financial decision made by farmers	3
• Outlines a financial decision a farmer could make	2
• Makes a relevant point relating to an increase in demand for a product	1

Sample answer:

In response to an increase in demand for a farm product many farmers will attempt to increase output of the product. In order to do so they may choose to increase the level of farm debt by borrowing money and investing in new machinery or new technologies. They may also decide to employ extra permanent or casual labour.

Answers could include:

- Purchasing extra land
- Increased expenditure on inputs.

Section II

Question 28 (a) (i)

Criteria	Marks
• Clearly links the need for research and the development of the biotechnology	3
• Outlines a reason for research into biotechnology	2
• Makes a relevant point	1

Answers could include:

Research is necessary when developing biotechnologies to help ensure that:

- the biotechnology helps improve production
- the production methods for using the biotechnology are developed
- the biotechnology is safe for the production of human food or fibre
- they ensure that the biotechnology meets government legislative requirements.

Question 28 (a) (ii)

Criteria	Marks
• Clearly links at least TWO of the components of the design to the reliability of the results obtained	5
• Clearly links ONE of the components of the design to the reliability of the results obtained	4
• Describes the design of the study OR describes the reliability of the results	3
• Outlines the design of the trial	2
• Makes a relevant point	1

Answers could include:

From an identified trial:

- identify and explain the use of replication
- identify and explain the use of randomisation
- identify and explain the use of standardisation.

Question 28 (b)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates extensive knowledge and deep understanding of production and use of biofuels, providing a range of detailed points for and/or against the production and use of biofuels as alternatives to fossil fuels • The response is logical and cohesive throughout • Uses relevant examples which are current to Australian agriculture to support the answer 	10–12
<ul style="list-style-type: none"> • Demonstrates knowledge and understanding of production and use of biofuels, providing a range of points for and/or against the production and use of biofuels as an alternative to fossil fuels • The response is mainly logical and cohesive throughout • Identifies relevant and current examples 	7–9
<ul style="list-style-type: none"> • Demonstrates limited knowledge and understanding of production and use of biofuels, providing some points for and/or against the production and use of biofuels as an alternative to fossil fuels • The response is organised • Includes some examples 	4–6
<ul style="list-style-type: none"> • Demonstrates very limited knowledge and understanding of production and use of biofuels, providing limited points for and/or against the production and use of biofuels as an alternative to fossil fuels • Response is disorganised 	1–3

Answers could include:

- production of ethanol/ methanol/ biodiesel/ methane
- the impact of biofuels vs fossil fuels on greenhouse gas production
- sustainability of biofuel production systems
- competition for resources for fuel production that could be used as human food
- use of land for crops to produce biofuels vs to produce food/fibre
- costs of biofuel production and fossil fuel costs
- problems associated with using biofuels in conventional engines.

Question 29 (a) (i)

Criteria	Marks
• Clearly links the need for research into climate variability to the development of management strategies related to it	3
• Outlines a reason for research into climate variability or the development of management strategies	2
• Makes a relevant point	1

Sample answer:

Research is necessary in this field to ensure that the management strategy:

- helps improve production
- achieves its claimed benefits
- meets government legislative requirements
- is cost effective
- can be integrated successfully into production systems.

Question 29 (a) (ii)

Criteria	Marks
• Clearly links at least TWO of the components of the design to the reliability of the results obtained	5
• Clearly links ONE of the components of the design to the reliability of the results obtained	4
• Describes the design of the study OR describes the reliability of the results	3
• Outlines the design of the trial	2
• Makes a relevant point	1

Answers could include:

From an identified trial:

- identify and explain the use of replication
- identify and explain the use of randomisation
- identify and explain the use of standardisation.

Question 29 (b)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates extensive knowledge and deep understanding of farming activities that may affect greenhouse gas levels, providing a range of detailed points for and/or against the activities • The response is logical and cohesive throughout • Uses relevant examples which are current to Australian agriculture to support the answer 	10–12
<ul style="list-style-type: none"> • Demonstrates knowledge and understanding of farming activities that may affect greenhouse gas levels, providing a range of points for and/or against the activities • The response is mainly logical and cohesive throughout • Identifies relevant and current examples 	7–9
<ul style="list-style-type: none"> • Demonstrates limited knowledge and understanding of farming activities that may affect greenhouse gas levels, providing some points for and/or against the activities • The response is organised • Includes some examples 	4–6
<ul style="list-style-type: none"> • Demonstrates very limited knowledge and understanding of farming activities that may affect greenhouse gas levels, providing limited points for and/or against the activities • Response is disorganised 	1–3

Answers could include:

- effect on soil carbon capture/release
- carbon capture in vegetation
- methane release from waterlogged soils
- methane release from ruminant animals
- nitrous oxides released by fertilisers
- use of fuels in farming machinery
- uses of biofuels.

Question 30 (a) (i)

Criteria	Marks
• Clearly links the need for research and the development of new technologies	3
• Outlines a reason for research into new technologies	2
• Makes a relevant point	1

Sample answer:

Research is required into new technologies such as robotics and GPS systems to ensure that they work efficiently and can be integrated into agricultural production systems. It is also important that the technology assists farmers in their production processes, is safe to use and is cost effective.

Question 30 (a) (ii)

Criteria	Marks
• Clearly links at least TWO of the components of the design to the reliability of the results obtained	5
• Clearly links ONE of the components of the design to the reliability of the results obtained	4
• Describes the design of the study OR describes the reliability of the results	3
• Outlines the design of the trial	2
• Makes a relevant point	1

Answers could include:

From an identified trial:

- identify and explain the use of replication
- identify and explain the use of randomisation
- identify and explain the use of standardisation.

Question 30 (b)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates extensive knowledge and deep understanding of a robotic technology, providing a range of detailed points for and/or against the technology • The response is logical and cohesive throughout • Uses a relevant example which is current to Australian agriculture to support the answer 	10–12
<ul style="list-style-type: none"> • Demonstrates knowledge and understanding of a robotic technology, providing a range of points for and/or against the technology • The response is mainly logical and cohesive throughout • Identifies a relevant and current example 	7–9
<ul style="list-style-type: none"> • Demonstrates limited knowledge and understanding of a robotic technology, providing some points for and/or against the technology • The response is organised • Includes an example 	4–6
<ul style="list-style-type: none"> • Demonstrates very limited knowledge and understanding of a robotic technology, providing limited points for and/or against the technology • Response is disorganised 	1–3

Answers could include:

- robotic dairies (automated milking systems)
- robotic shearing
- autonomous drones
- robotic harvesters
- robotic weed sprayers.

2016 HSC Agriculture Mapping Grid

Section I Part A

Question	Marks	Content	Syllabus outcomes
1	1	Chemical label interpretation p22	H2.1
2	1	Pasture production systems p21	H2.1
3	1	Phases of plant growth p21	H2.1
4	1	Water quality p20	H1.1
5	1	Identify root nodules p21	H2.1
6	1	Plant breeding systems p22	H2.1
7	1	Calculate a mean p24	H2.1
8	1	Muscle, fat, bone proportions p23	H2.2
9	1	Water quality p20	H1.1
10	1	Animal welfare p24	H2.2
11	1	Soil physical characteristics p19	H1.1
12	1	Ion exchange p19	H1.1
13	1	Nitrogen cycle p19	H2.1
14	1	Supply and demand p26	H3.1
15	1	Gross margin analysis p25	H3.1
16	1	Net assimilation rate p21	H2.1
17	1	Role of hormones p23	H2.2
18	1	Breeding systems p23	H2.2
19	1	Rumen microbes p22	H2.2
20	1	Decision making p25	H3.4

Section I Part B

Question	Marks	Content	Syllabus outcomes
21 (a)	2	Managing nutritional requirements p22	H2.2
21 (b)	4	Design and explain a ration p22	H2.2
22 (a)	4	Techniques to manage soil fertility p20	H1.1
22 (b)	3	Community/government groups p20	H1.1
23 (a)	3	Experimental design p24	H4.1
23 (b)	4	Standardisation p24	H4.1
23 (c)	3	Propose recommendations p24	H4.1
24 (a)	2	Sources of competition p24	H2.1
24 (b)	3	Managing competition p21	H2.1
24 (c)	6	Environmental constraints p22	H2.1
25	6	Ethics/welfare/legal issues p24	H2.2
26 (a)	2	Advertising/promotion p26	H3.2

Question	Marks	Content	Syllabus outcomes
26 (b)	4	Market specifications p26	H3.2
26 (c)	6	Evaluate management strategies p26	H3.3
27 (a)	4	Vertical integration p25	H2.2
27 (b)	4	Product supply/demand p26	H3.1

Section II

Question	Marks	Content	Syllabus outcomes
28 (a) (i)	3	Explain the need for research p28	H4.1
28 (a) (ii)	5	Analyse a research study p28	H4.1
28 (b)	12	Biofuel production p28	H5.1
29 (a) (i)	3	Explain the need for research p31	H4.1
29 (a) (ii)	5	Analyse a research study p31	H4.1
29 (b)	12	Climate changes/human activity p30	H3.4
30 (a) (i)	3	Explain the need for research p33	H4.1
30 (a) (ii)	5	Analyse a research study p33	H4.1
30 (b)	12	Robotics p32	H5.1