

STUDENT NUMBER Letter

AGRICULTURAL AND HORTICULTURAL STUDIES

Written examination

Monday 6 November 2023

Reading time: 9.00 am to 9.15 am (15 minutes)

Writing time: 9.15 am to 10.45 am (1 hour 30 minutes)

QUESTION AND ANSWER BOOK

Structure of book

<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
13	13	100

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners and rulers.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or correction fluid/tape.
- No calculator is allowed in this examination.
- Additional space is available at the end of the book if you need extra space to complete an answer.

Materials supplied

- Question and answer book of 20 pages

Instructions

- Write your **student number** in the space provided above on this page.
- All written responses must be in English.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

Instructions

Answer **all** questions in the spaces provided.

Question 1 (8 marks)

Quality assurance (QA) programs for fresh produce enable primary producers to demonstrate that their on farm practices allow them to produce safe food products that meet Australian food safety standards under the Australia New Zealand Food Standards Code (the Code).

Source: adapted from Western Australian Department of Primary Industries and Regional Development 2023, 'Quality assurance schemes for fresh produce'; <agric.wa.gov.au>

- a. In the food and fibre supply chain, list **two** implications for primary producers who do **not** follow quality assurance programs for their products.

2 marks

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Question 2 (13 marks)

Climate projections have suggested that both horticultural and agricultural producers will experience a number of challenges due to climatic impacts, particularly in the growing and harvesting stages of their food and fibre businesses.

Source: adapted from New South Wales Department of Primary Industries 2022, 'Climate change research strategy'; <dpi.nsw.gov.au/>

Recently, producers in the state of Victoria have experienced the impact of climate change throughout the growing and harvesting stages of potato crops.

- a. Identify **one** negative impact of climate change on potato production and analyse its effect on the economic sustainability of the potato industry. 4 marks

- b. Describe **two** sustainable strategies that could be used by potato producers to mitigate climate change challenges on farm. 4 marks

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Question 3 (12 marks)

A ‘down cow’ is a cow that is unable to stand unassisted, or get to her feet unassisted. Cows may be down for a variety of reasons, such as milk fever.

Milk fever is caused by a low blood calcium level. Around calving time, cows need to mobilise large amounts of calcium from body stores, such as bone, to cope with the large calcium losses into the milk. If this occurs too slowly, the amount of calcium in the blood may fall below optimal levels, resulting in milk fever.

Source: adapted from Dairy Australia 2023, ‘Down Cows’;
<dairyaustralia.com.au>

- a. Describe **two** treatments that are provided for a ‘down cow’ with milk fever. 4 marks

- b. Discuss **two** strategies that can be employed to prevent milk fever. 4 marks

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c. Milk fever is a metabolic disease. Describe **two** characteristics of metabolic diseases.

4 marks

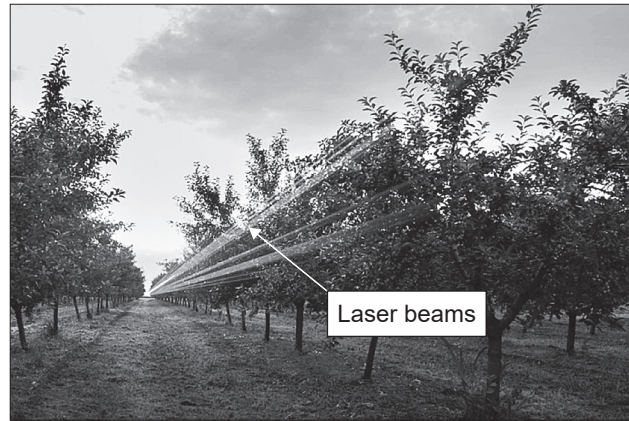
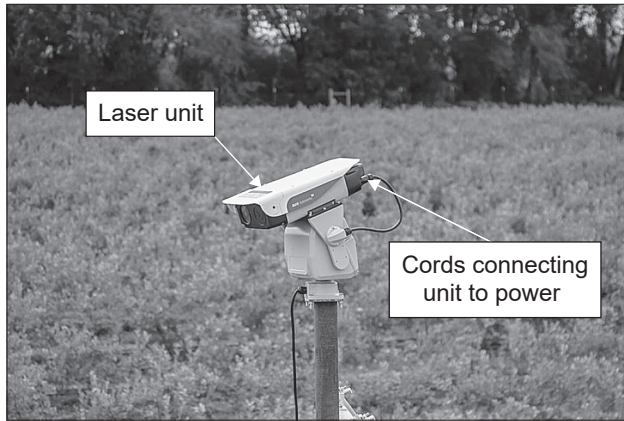
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Question 4 (7 marks)

Bird presence is a significant problem in the horticulture industry and causes \$300 million worth of damage to crops across Australia annually. Traditional methods such as netting, scare guns and visual deterrents have had limited success. A new method is being implemented on some Australian farms using laser technology to produce a narrow beam of light that scares birds away from the area. Due to birds having different vision to humans, they see the laser beam as a solid object and are scared away without any physical harm and, as a result, settle elsewhere.

Source: adapted from Bird Control Group 2023, 'Australian horticulture grower reduces bird presence by up to 90%'; <birdcontrolgroup.com>



Source: ABC News 2023, Responsible bird-deterrent technology helps grower, puts dejected farm dog out of job; <abc.net.au> images reproduced by permission; © Bird Beam

- a. Explain **one** way that you could measure the success or failure of using the laser bird-deterrent technology in the horticulture industry.

3 marks

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- b. Describe **one** possible advantage of using laser bird-deterrent technology on Australian farms. 2 marks

- c. Describe **one** possible disadvantage of using laser bird-deterrent technology on Australian farms. 2 marks

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Question 5 (9 marks)

Australian agricultural and horticultural businesses are governed by state and federal regulations and policies. These affect the social, economic, and environmental dimensions of sustainability across the food and fibre industries.

For each government Act, list **one** dimension of sustainability that is influenced by the Act.

For each government Act, outline how the Act positively affects the dimension of sustainability.

- a. *Environment Protection Act 1970* 3 marks

Dimension of sustainability _____

- b. *Occupational Health and Safety Act 2004* 3 marks

Dimension of sustainability _____

- c. *Catchment and Land Protection Act 1994* 3 marks

Dimension of sustainability _____

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Question 6 (6 marks)

In May 2022, an outbreak of foot-and-mouth disease (FMD) was reported in cattle in Indonesia. A spread of the disease to Australia would have severe consequences for Australia's animal health and trade.

The emergence and rapid spread of FMD in Indonesia has increased the risks from passengers and goods arriving in Australia. As a result, border protection measures have been strengthened and new measures immediately imposed to help prevent an incursion.

FMD is a serious and highly contagious animal disease that affects all cloven-hoofed animals¹ including cattle, sheep, goats, camelids, deer and pigs. It does not affect horses or zebras.

¹**Cloven-hoofed animals** – those with divided hooves

Source: adapted from Australian Government Department of Agriculture, Fisheries and Forestry 2022, 'Foot-and-mouth disease'; <agriculture.gov.au>

- a. Describe **one** measure the Australian Government can put into place in order to reduce the biosecurity risk posed by FMD. 3 marks

- b. Describe the role of biosecurity measures in supporting the sustainability of Australian agriculture and horticulture. 3 marks

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Question 7 (7 marks)

‘The impact of parasite loads such as intestinal worms may not always be obvious and yet low levels of infection can still impact growth and productivity. In beef grazing systems of southern Australia, parasites have a high economic impact. Costs to industry have been estimated to be over \$80 million; comprising \$42.4 million in preventative costs and \$39.6 million in impacts on production.’

Source: Agriculture Victoria 2023, ‘Worm control for weaned stock’;
<agriculture.vic.gov.au>

- a. Describe **one** strategy to reduce the incidence of intestinal worms on a livestock property. 2 marks

- b. Parasites such as intestinal worms can be managed through an integrated approach. Outline **three** ways of managing risk factors. 3 marks

- c. Explain **one** impact of intestinal worms on the agriculture industry. 2 marks

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Question 8 (9 marks)

- a. Consider the resources listed in the table below that are used in agricultural and horticultural businesses. Identify an environmentally sustainable conservation option or method for each of the listed resources.

3 marks

Resource	Conservation option or method
Fuel	
Electricity	
Water	

- b. Propose one strategic approach to managing **each** of the types of environmental degradation listed below.

6 marks

Environmental degradation	Strategy
Erosion	
Salinity	
Waterlogging	
Compaction	
Soil acidity	
Turbidity	

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Question 10 (4 marks)

Cereal crops are often cut for hay for the export market, to be used as animal feed product. There are quality requirements to sell hay for export, which include testing hay for weeds, foreign material, disease, chemical residue and nitrates.

a. Describe **one** reason hay is grown for export.

2 marks

b. Describe **one** strategy a producer could use to broaden their market for Australian primary produce if a product, such as cereal hay, is not of export quality.

2 marks

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Question 11 (7 marks)

Australians are increasingly holding the point of view that food and fibre production should be more sustainably and ethically produced. This point of view can have an influence on their purchasing preferences and put new demands on food and fibre producers.

Source: adapted from Food and Beverage Industry News 2022,
'Research shows Australian consumers seek ethical brands';
<foodmag.com.au>

- a. Identify an example of **one** sustainable or ethical consumer demand in the agricultural or horticultural industry. 1 mark

- b. Describe **one** action the agricultural or horticultural industry has taken to respond to the demand listed in **part a**. 2 marks

- c. Evaluate the impact of adopting the action from **part b** on the food or fibre industry by explaining **one advantage** and **one disadvantage** experienced by the food or fibre producer. 4 marks

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Question 12 (8 marks)

Weeds such as gorse grow in many regions of Victoria including the Wimmera, North Central, West Gippsland, Goulburn Broken, North East Corangamite, Glenelg Hopkins, Port Phillip and Western Port.

Source: Agriculture Victoria 2020, 'Gorse'; <agriculture.vic.gov.au>

- a. Outline **two** ways in which weeds like gorse can be reproduced or dispersed across a property. 2 marks

- b. Explain **two** strategies for the control of gorse. 4 marks

- c. Explain **one** impact of gorse on the food or fibre industries 2 marks

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Question 13 (6 marks)

Milk is an important source of protein. Casein is one type of protein found in milk. There are many different types of casein, one of which is called beta-casein. The two most common forms of beta-casein are A1 and A2. Australians produce and drink milk containing a mixture of the A1 and A2 proteins. In recent years, cows have been genetically selected to produce only the A2 protein. Milk from these cows has been bottled for consumers under the A2 milk label.

Consumer awareness of the benefits of A2 milk has led to its growing popularity.

- a. Explain **two** possible influences on the decision of producers to breed and milk cows that produce A2 milk. 4 marks

- b. Outline **one** reason why some dairy farmers may not produce A2 milk. 2 marks

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