

STUDENT NUMBER  Letter

# AGRICULTURAL AND HORTICULTURAL STUDIES

## Written examination

Monday 11 November 2019

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>
8	8	100

- Students are to write in blue or black pen.
- 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.

#### Materials supplied

- Question and answer book of 19 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** (14 marks)

- a. Animal and plant environments can be modified in many ways to improve production, including through the use of modification techniques to alter or control climatic or environmental conditions.

Describe **one** modification technique that could be used to achieve each of the following tasks. 5 marks

- Increase the water-holding capacity of a sandy soil

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- Minimise the turbidity of water in a dam that provides drinking water for livestock

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- Decrease the humidity in a glasshouse or polyhouse

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- Maximise the germination of hard-coated seeds

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- Reduce the effect of wind on a cut flower crop

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b. Maxwell was advised to plant windbreaks as strong winds were having a detrimental impact on the stability of his broadacre cropping soil.

i. How would the soil management technique of planting windbreaks improve soil stability in this situation? 2 marks

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ii. Outline **one** other soil management technique that Maxwell should consider in order to help stabilise his soil. 2 marks

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c. Maxwell also has an agricultural enterprise producing prime lamb.

Give two benefits of the proposed windbreaks for this enterprise. 2 marks

1. 

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2. 

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- d. Maxwell has used a green manure crop (a combination of a legume and a grass) to improve his soil condition for growing a future vegetable or cereal crop.

Describe three benefits of this technique or similar sustainable soil management techniques.

3 marks

1. \_\_\_\_\_

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2. \_\_\_\_\_

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3. \_\_\_\_\_

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**Question 2** (13 marks)

- a. Australia is considered to have harsh environmental conditions and some of the least fertile soils for agricultural and horticultural enterprises.

Outline **one** method of prevention or rectification that a land manager could use to address each of the following soil degradation issues.

3 marks

Compaction/hardpan \_\_\_\_\_

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Salinity \_\_\_\_\_

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Acidity \_\_\_\_\_

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- b. Organic matter is an important component of healthy soil.

Suggest **two** benefits of improving the organic matter content of soil or other growing media.

2 marks

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- c. Explain the term 'soil compaction' and describe its impact on productivity. 4 marks

Soil compaction \_\_\_\_\_

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Impact on productivity \_\_\_\_\_

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Paula runs a sheep and cattle enterprise. Due to drought, she is forced to feed her animals high levels of grain.

- d. Describe the possible impact of introducing high levels of grain into her animals' diets. 2 marks

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e. Describe how Paula would manage her animals' health while feeding them high levels of grain. 2 marks

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**Question 3** (11 marks)

The table below shows the prescribed list of weeds for study in 2019.

Common name of weed	Scientific name
annual ryegrass (Wimmera ryegrass)	<i>Lolium rigidum</i>
brome grass	The following are the two most common species: <i>Bromus diandrus</i> <i>Bromus rigidus</i>
capeweed	<i>Arctotheca calendula</i>
gorse/furse	<i>Ulex europaeus</i>
serrated tussock	<i>Nassella trichotoma</i>
wild radish	<i>Raphanus raphanistrum</i>

Choose one weed from the prescribed list.

Chosen weed \_\_\_\_\_

Identify one type of business that would be affected by your chosen weed.

Type of business \_\_\_\_\_

- a.** Which weeds from the prescribed list would particularly affect crops? 2 marks

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- b.** List **two** ways by which your chosen weed could be spread. 2 marks

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c. Suggest **two** ways in which your chosen weed could have a detrimental impact on production in your chosen type of business.

2 marks

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d. Explain how a grazing or cropping business could control your chosen weed using an integrated weed management plan. Your response should include:

- **one** strategy that could be used to control the weed, including the specification for any herbicide if suggested
- an outline that gives the timing for efficient management or control of your chosen weed
- a method of monitoring and recording the integrated weed management plan to determine its success.

5 marks

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**Question 4** (11 marks)

The table below shows the prescribed list of pests and diseases for study in 2019.

Common name of pest or disease	Scientific name
aphids	assorted species
intestinal worms (ruminants)	assorted species
one of the following: <ul style="list-style-type: none"> <li>wheat rust</li> <li>barley rust</li> <li>grapevine rust</li> <li>rose rust</li> </ul>	<ul style="list-style-type: none"> <li><i>Puccinia triticina</i></li> <li><i>Puccinia hordei</i></li> <li><i>Phakopsora euvitis</i></li> <li><i>Phragmidium</i> sp.</li> </ul>
mastitis	The following are the main mastitis pathogens: <ul style="list-style-type: none"> <li><i>Staphylococcus aureus</i></li> <li><i>Streptococcus agalactiae</i></li> <li><i>Streptococcus uberis</i></li> </ul>
coccidiosis	<i>Eimeria</i> spp.
subacute ruminal acidosis (SARA)	n.a.
Queensland fruit fly	<i>Bactrocera tryoni</i>
western flower thrips	<i>Frankliniella occidentalis</i>

Choose one pest or disease from the prescribed list.

Chosen pest or disease \_\_\_\_\_

- a. From the prescribed list above, identify one example of each of the following types of diseases. 3 marks

Type of disease	Example
metabolic	
metazoal	
microbial	

- b. List two symptoms or signs that would indicate the presence of your chosen pest or disease. 2 marks

1. \_\_\_\_\_

2. \_\_\_\_\_

- c. Suggest two effects that your chosen pest or disease would have on a type of agricultural or horticultural business that you are familiar with. 2 marks

Chosen type of business \_\_\_\_\_

Effect 1 \_\_\_\_\_

\_\_\_\_\_

Effect 2 \_\_\_\_\_

\_\_\_\_\_

- d. i. Farm biosecurity is an integral component of good land management.

What are **two** examples of agricultural or horticultural enterprise inputs that are potential biosecurity risks?

2 marks

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\_\_\_\_\_

\_\_\_\_\_

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- ii. Visitors are considered a potential biosecurity risk.

What are **two** techniques a farmer could use to manage this risk?

2 marks

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**Question 5 (19 marks)**

**a.** Traditionally, farm property fence lines or boundary lines conform to a grid or roadway.

Explain why it would be better for a property’s fence line or boundary line to follow a natural feature, such as a ridge line or waterway.

3 marks

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**b. i.** Other than plants, what indicators of waterlogged soil caused by a saline discharge area would be noticeable **prior to** any rehabilitation?

2 marks

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**ii.** Name two plant species that are likely to be dominant prior to any rehabilitation of waterlogged soil caused by a saline discharge area.

2 marks

1. \_\_\_\_\_

2. \_\_\_\_\_

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c. A farmer is growing white clover for certified seed production.

- i. The farmer was advised to have her soil tested. Based on the soil test results, the farmer was advised to apply lime at the rate of one tonne per hectare.

What are three factors that could have prompted this advice?

3 marks

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

- ii. The farmer grows her white clover in a crop rotation program.

Give two benefits of crop rotation for future cereal crops.

2 marks

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

- d. i. What documentation must accompany the sale of livestock?

1 mark

\_\_\_\_\_

- ii. Name three species of ruminant animals that are likely to be found on a farm.

3 marks

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

- iii. When managing livestock, what are three vital animal welfare issues that must be addressed?

3 marks

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

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**Question 6** (12 marks)

- a. Name two specific new or emerging technologies that improve agricultural or horticultural enterprises. 2 marks

Technology 1 \_\_\_\_\_

Technology 2 \_\_\_\_\_

Choose one of the technologies named in **part a**.

Technology \_\_\_\_\_

- b. Describe how your chosen new or emerging technology works, including its functions and operation. 3 marks

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- c. Identify an agricultural or horticultural enterprise where your chosen new or emerging technology could be used.

Agricultural or horticultural enterprise \_\_\_\_\_

How will your chosen new or emerging technology have an impact on the sustainability of the agricultural or horticultural enterprise identified?

3 marks

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- d. Describe the old technology or methods used before your chosen new or emerging technology was introduced, including the functions and operation of the old technology or methods. 2 marks

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- e. Apart from cost, give one advantage and one disadvantage of your chosen new or emerging technology for an agricultural or horticultural enterprise. 2 marks

Advantage \_\_\_\_\_

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Disadvantage \_\_\_\_\_

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**Question 7** (8 marks)

Agricultural and horticultural businesses will need to adapt to climate change to remain profitable.

Choose one type of business and one climate change issue from the lists below.

Types of business

- irrigated vegetable production
- dryland cropping
- animal production
- plant nursery

Chosen type of business \_\_\_\_\_

Climate change issues

- increase in mean temperatures
- decrease in average annual rainfall
- shift in rainfall patterns
- increased frequency of very hot days
- increased incidence of extreme weather events

Chosen climate change issue \_\_\_\_\_

**a.** Explain **two** ways in which your chosen type of business might contribute to climate change. 4 marks

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- b. Identify **two** impacts that your chosen climate change issue could have on production in your chosen type of business.

2 marks

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- c. Suggest **two** changes that a farmer in your chosen type of business could make to better cope with your chosen climate change issue.

2 marks

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**Question 8** (12 marks)

Choose one type of agricultural or horticultural business that you have studied this year or one that you are familiar with in terms of its business operations. Give the main product for this type of business.

Type of business \_\_\_\_\_

Main product \_\_\_\_\_

- a. State one key quality standard for the final product of your chosen type of business and describe how it would be measured. 2 marks

Quality standard \_\_\_\_\_

How it would be measured \_\_\_\_\_

- b. What are **three** important considerations when developing a business plan and deciding on or evaluating a location for your chosen type of business? 3 marks

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- c. Identify one potential health and safety risk to an employee in your chosen type of business. Describe how this potential risk could occur and suggest one strategy that could be used to minimise the potential risk to an employee.

3 marks

Potential risk identified \_\_\_\_\_

How potential risk could occur \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Strategy to minimise potential risk \_\_\_\_\_

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- d. Explain how your chosen type of business could have an impact on the environment.

2 marks

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- e. What are two important reasons for developing a cash flow estimate as part of the business plan for your chosen type of business?

2 marks

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

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