

STUDENT NUMBER

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# AGRICULTURAL AND HORTICULTURAL STUDIES

## Written examination

Thursday 13 November 2014

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> |
|----------------------------|---|------------------------|
| 14                         | 14  | 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 white out liquid/tape.
- No calculator is allowed in this examination.

#### Materials supplied

- Question and answer book of 18 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. Write using black or blue pen.

**Question 1** (3 marks)

- a. Identify **one** technique for modifying farm topography. 1 mark

\_\_\_\_\_

- b. Outline two pre-sowing treatments that can be used to aid the germination of hard-coated seeds. 2 marks

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

\_\_\_\_\_

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

\_\_\_\_\_

**Question 2** (4 marks)

Identify two advantages and two disadvantages of using a drip irrigation system rather than an overhead sprinkler system to water the trees in an orchard.

| Advantage | Disadvantage |
|-----------|--------------|
| 1.        | 1.           |
| 2.        | 2.           |

**Question 3** (4 marks)

Organic matter in soil or potting mix is generally good for plants.

- a.** Give two specific benefits of having organic matter in soil or potting mix. 2 marks

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

\_\_\_\_\_

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

\_\_\_\_\_

- b.** What are two problems that may be caused by organic matter in soil or potting mix? 2 marks

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

\_\_\_\_\_

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

\_\_\_\_\_

**Question 4** (3 marks)

A manager needs to supply food and water to intensively managed animals (such as those in feed lots, cages or pens).

Outline three other things the manager can do so that the animals have the optimum environment for production.

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

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**Question 5** (4 marks)

Sue is considering growing commercial crops of cherry tomatoes. She is thinking of growing them hydroponically in a polyhouse instead of in a field.

Outline four advantages of growing cherry tomatoes hydroponically in a polyhouse rather than in a field.

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

\_\_\_\_\_

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

\_\_\_\_\_

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

\_\_\_\_\_

4. \_\_\_\_\_

\_\_\_\_\_

**Question 6** (6 marks)

| Common name of weed                          | Scientific name                   |
|--|-----------------------------------|
| artichoke thistle                            | <i>Cynara cardunculus</i>         |
| capeweed                                     | <i>Arctotheca calendula</i>       |
| flickweed (also known as common bittercress) | <i>Cardamine hirsuta</i>          |
| Paterson's curse                             | <i>Echium plantagineum</i>        |
| annual ryegrass (also known as Wimmera rye)  | <i>Lolium rigidum</i>             |
| blackberry                                   | <i>Rubus fruticosus</i> aggregate |

- a. Choose a weed other than flickweed from the table above. Discuss the effect that this weed may have on animals.

2 marks

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

Effect on animals \_\_\_\_\_

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- b. Choose a weed other than capeweed from the table above. Discuss the effect that this weed may have on crops.

2 marks

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

Effect on crops \_\_\_\_\_

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- c. Choose a weed from the table above other than those chosen in **parts a.** and **b.** Discuss the effect that this weed may have on the quality of a final agricultural or horticultural product produced by an agricultural or horticultural business. Suggest an example of a product that could be affected by the chosen weed.

2 marks

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

Example of product \_\_\_\_\_

Effect on product \_\_\_\_\_

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**Question 7** (6 marks)

A home **organic** gardener notices small patches of Paterson's curse in their garden beds. On further investigation, the gardener learns that the weed is classed as a regionally controlled weed.

- a. i.** What does the term 'weed' mean? 1 mark

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- ii.** What does the term 'regionally controlled' mean? 1 mark

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- b.** Outline four techniques of an integrated weed management plan, to control and eradicate weeds, that would be compatible with organic farming. 4 marks

1. 

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2. 

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3. 

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4. 

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**Question 8** (4 marks)

To prevent weeds from entering the property, a primary producer places this sign at the property's entry points.



- a. This sign forms part of a \_\_\_\_\_ 1 mark
- b. The primary producer uses contractors for sowing pastures, spreading fertiliser, and the cutting and baling of hay.

Outline the measures the primary producer should ask visitors and contractors to take before entering the property, to ensure that no foreign weed species are introduced to the property. 3 marks

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**Question 9** (8 marks)

| Common name of pest or disease   | Scientific name   | Animal or plant it affects (host)   |
|--|---|---|
| aphids   | assorted species<br>family: <i>Aphididae</i>  | ornamental plants, vegetables   |
| coccidiosis  | <i>Eimeria spp.</i>   | poultry, cattle, sheep and pigs   |
| one of the following:<br>cattle lice<br>sheep lice<br>equine lice<br>chicken body lice | <i>Linognathus vituli</i><br><i>Bovicola bovis</i><br><i>Haematopinus asini</i><br><i>Menacanthus stramineus</i>                  | cattle<br>sheep<br>horses<br>fowl   |
| liver fluke  | <i>Fasciola hepatica</i>  | sheep, goats, cattle  |
| mastitis   | The main mastitis pathogens are: <i>Staphylococcus aureus</i> , <i>Streptococcus agalactiae</i> and <i>Streptococcus uberis</i> . | dairy cattle, sheep, goats  |
| milk fever   | hypocalcaemia   | cattle, goats   |
| footrot  | <i>Dichelobacter nodosus</i>  | sheep, goats, horses, cattle  |
| western flower thrips  | <i>Frankliniella occidentalis</i>   | ornamental plants, fruit and vegetable crops  |
| stem and bulb nematodes  | <i>Ditylenchus dipsaci</i>  | cereal and grain crops, potatoes, legumes, flowering bulbs (e.g. tulips, daffodils) |

Choose one pest or disease from the table above.

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

**a.** Describe the symptoms or signs that indicate this pest or disease is present on a property.

2 marks

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**b.** What are two impacts that this pest or disease may have on an agricultural or horticultural business? 2 marks

Impact 1 \_\_\_\_\_  
\_\_\_\_\_

Impact 2 \_\_\_\_\_  
\_\_\_\_\_

**c.** Discuss one prevention method and one treatment method for this pest or disease. 4 marks

Prevention method \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Treatment method \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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**Question 10** (10 marks)

New and emerging technologies and innovations are important for the development of agricultural and horticultural industries. In this question, you will write about **two different** innovations or technologies.

a. Name **one** new or emerging agricultural or horticultural innovation or technology.

\_\_\_\_\_

i. Describe how this innovation or technology works or is used. 2 marks

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

ii. Assess the likely impact of adopting this innovation or technology by comparing it with current practice. You should give at least **one** advantage and **one** disadvantage of adopting the new or emerging innovation or technology. 3 marks

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b. Name **another** new or emerging agricultural or horticultural innovation or technology.

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i. Describe how this innovation or technology works or is used.

2 marks

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ii. Assess the likely impact of adopting this innovation or technology by comparing it with current practice. You should give at least **one** advantage and **one** disadvantage of adopting the new or emerging innovation or technology.

3 marks

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**Question 11** (6 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:

- dryland cropping
- dairying
- irrigated fruit trees
- urban wholesale nursery

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

Climate change issues:

- increase in mean temperature, reduced chilling
- decrease in average annual rainfall
- shift in rainfall pattern
- increased frequency of very hot days

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

**a.** Explain the impact of the chosen climate change issue on the type of business selected. 3 marks

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**b.** Outline some practices this type of business could use in order to adapt to the chosen climate change issue. 3 marks

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**Question 12** (14 marks)

Choose one type of commercial agricultural or horticultural business from the table below, or another type of business that you have studied in terms of its business operations.

|                  |                                  |   |   |
|------------------|----------------------------------|---|---|
| cereal cropping  | fish or yabbies                  | container-grown<br>ornamentals              | horses for recreation                     |
| poultry for meat | turf production                  | field-grown vegetables,<br>herbs or flowers | rearing rabbits for pet<br>or meat market |
| poultry for eggs | garden design/<br>construction   | hydroponic production                       | grapevines                                |
| beef cattle      | ornamental garden<br>maintenance | production of fruit/nuts<br>from trees      | production of<br>indigenous plants        |
| pigs             | polyhouse/glasshouse<br>plants   | sheep or goats                              | dairy cattle                              |

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

- a. For your chosen type of business, use specific examples to outline how each of the following is monitored and managed to ensure that a product or service meets the quality standards that the market expects. 4 marks

An input \_\_\_\_\_

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A process \_\_\_\_\_

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**b.** When developing a business plan and deciding on or evaluating a location, what factors would you need to consider for your chosen type of business in terms of the following?

6 marks

Physical environment \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Marketing \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Government policies and regulations \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**c.** Describe two methods used to analyse the financial performance of the business to keep it economically sustainable.

4 marks

Method 1 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Method 2 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Question 13** (22 marks)**Scenario A**

A dairy farmer is considering purchasing a neighbouring property. Upon viewing the property, he notices sustainability issues. The farmer has observed algal growth in a waterway that flows through the pastures, as well as areas with many wheel marks, where water collects and remains for long periods after it rains. The farmer has also noticed that other areas of pasture indicate slow growth.

**Scenario B**

A dryland farmer is facing a similar situation. A neighbouring property is for sale and the farmer is considering buying the extra paddocks so that her daughter can return to the farm after studying at university. The daughter has walked over the paddocks and taken note of a few issues. She has noted that in some low-lying areas, dryland salinity problems may have begun. She has also noticed that the fence lines have high levels of drift sand along their length.

Both properties have an area of natural bushland. These areas have not been farmed or grazed in any way. The farmland in both scenarios has been described as a managed ecosystem and the bushland as a natural ecosystem.

Select Scenario A or Scenario B and answer the questions that follow.

Scenario \_\_\_\_\_

- a. Discuss the differences between the natural ecosystem and the managed ecosystem for your selected scenario in terms of biodiversity, biomass and the cycling of matter.

4 marks

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**b.** Complete the table below by identifying two sustainability issues for your selected scenario, one environmental indicator associated with each issue that an inspector of the property would notice and two methods by which each issue could be overcome.

8 marks

| Issue | Indicator | Method of overcoming the issue |
|-------|-----------|--------------------------------|
| 1.    | 1.        | 1.                             |
|       |           | 2.                             |
| 2.    | 2.        | 1.                             |
|       |           | 2.                             |

**c.** Over time, preventing issues from occurring can save money.

**i.** State how one of the issues mentioned in **part b.** could be prevented from occurring in other areas of the farm.

1 mark

Issue \_\_\_\_\_

Prevention method \_\_\_\_\_

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ii. Explain how this prevention method could bring about the desired effect.

3 marks

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d. Choose one issue identified in **part b.** and discuss how each form of sustainability below is affected by the chosen issue.

6 marks

Issue \_\_\_\_\_

Social sustainability \_\_\_\_\_

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Environmental sustainability \_\_\_\_\_

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Economic sustainability \_\_\_\_\_

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TURN OVER

