AGRICULTURAL AND HORTICULTURAL STUDIES

Written examination

Wednesday 7 November 2007
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

<table>
<thead>
<tr>
<th>Number of questions</th>
<th>Number of questions to be answered</th>
<th>Number of marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>7</td>
<td>100</td>
</tr>
</tbody>
</table>

• 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 24 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.

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Instructions

Answer all questions in the spaces provided.

In Question 7, choose one case study and answer the questions. There are four case studies to choose from.

Question 1

Animal and plant environments may be modified in many ways to improve production.

a. For each of the following state two ways to

i. increase the water-holding capacity of growing media or soil

1. 

2. 

ii. reduce the turbidity of water in a dam used for stock drinking water

1. 

2. 

iii. improve the drainage of a paddock by altering its topography

1. 

2. 

iv. reduce the light intensity in a glasshouse.

1. 

2. 

2 + 2 + 2 + 2 = 8 marks
b. Often there are a number of ways to modify a specific aspect of a plant’s or animal’s growing environment.

i. What are the advantages and disadvantages of deep ripping a paddock instead of adding organic matter and gypsum to increase soil aeration?

ii. What are the advantages and disadvantages of using a drip irrigation system instead of an overhead sprinkler system to water trees in an orchard?

iii. What are the advantages and disadvantages of using a perlite/vermiculite mix instead of a sand/peat moss mix for propagating cuttings?

3 + 3 + 3 = 9 marks

Total 17 marks
Question 2
Choose one pest or disease from the list provided in Table 1 (below). Show your choice by placing a tick in the box next to it.

**Table 1.** Selected pests or diseases

<table>
<thead>
<tr>
<th>mosaic virus</th>
<th>lice</th>
</tr>
</thead>
<tbody>
<tr>
<td>downy mildew</td>
<td>red-legged earth mite</td>
</tr>
<tr>
<td>grass tetany</td>
<td>aphids</td>
</tr>
<tr>
<td>pulpy kidney</td>
<td>snails</td>
</tr>
<tr>
<td>rust</td>
<td>liver fluke</td>
</tr>
</tbody>
</table>

a. What specific business type does this pest or disease affect?

________________________________________________________

________________________________________________________

1 mark

b. What are the symptoms (signs) that show this pest or disease is present?

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

2 marks
c. Explain in detail an integrated pest or disease management strategy a manager could use to prevent and control this pest or disease.

___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

5 marks

d. From the list of pests and diseases in Table 1, give an example of a

i. fungal disease ____________________________________________________________

ii. metabolic disease _______________________________________________________

iii. bacterial disease ________________________________________________________

1 + 1 + 1 = 3 marks

Total 11 marks
**Question 3**
Choose one weed you are familiar with from Table 2 (below). Show your choice by placing a **tick** in the box next to it.

**Table 2. Selected weeds**

<table>
<thead>
<tr>
<th>Paterson’s curse (<em>Echium plantagineum</em>)</th>
<th>Wild oats (<em>Avena fatua</em>)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ragwort (<em>Senecio jacobaea</em>)</td>
<td>Liverwort (<em>Marchantia polymorpha</em>)</td>
</tr>
<tr>
<td>Variegated thistle (<em>Silybum marianum</em>)</td>
<td>Winter grass (<em>Poa annua</em>)</td>
</tr>
<tr>
<td>Silver grass (<em>Vulpia spp.</em>)</td>
<td>Gorse (<em>Ulex europaeus</em>)</td>
</tr>
<tr>
<td>Chilean needlegrass (<em>Nassella neesiana</em>)</td>
<td>Wild radish (<em>Raphanus raphanistrum</em>)</td>
</tr>
</tbody>
</table>

a. Explain how a manager would prevent **and** control this weed.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

3 marks

b. Give three examples of how your chosen weed affects the sustainability of a business.

Example 1

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Example 2

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Example 3

________________________________________________________________________
________________________________________________________________________

3 marks

Total 6 marks
Question 4

Technology
In this question you will be answering questions about two new or emerging technologies associated with a specific agricultural or horticultural business.

Choose one agricultural or horticultural business with which you are familiar from Table 3 (below). Show your choice by placing a tick in the box next to it. (Choose one only.)

Table 3. Selected business types

<table>
<thead>
<tr>
<th>Cereal cropping</th>
<th>Garden design/construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poultry for meat</td>
<td>Ornamental garden maintenance</td>
</tr>
<tr>
<td>Poultry for eggs</td>
<td>Glasshouse plants</td>
</tr>
<tr>
<td>Beef cattle</td>
<td>Container-grown ornamentals</td>
</tr>
<tr>
<td>Pigs</td>
<td>Field-grown vegetables, herbs or flowers</td>
</tr>
<tr>
<td>Sheep or goats</td>
<td>Production of indigenous plants</td>
</tr>
<tr>
<td>Dairy cows</td>
<td>Hydroponic production</td>
</tr>
<tr>
<td>Grapevines</td>
<td>Production of fruit/nuts from trees</td>
</tr>
<tr>
<td>Fish or yabbies</td>
<td>Horses for recreation</td>
</tr>
<tr>
<td>Turf production</td>
<td>Rearing rabbits for pet or meat market</td>
</tr>
</tbody>
</table>

a. Name two different new or emerging technologies that your chosen business is using, or could use.

Technology 1

Technology 2

2 marks

b. i. Explain how the new or emerging technology 1 you have named in part a. works or is done.

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________
ii. For this new or emerging technology 1, explain the advantages and disadvantages it has over previously used technologies with regard to the economic sustainability of the business.

ii. For this new or emerging technology 2, explain the advantages and disadvantages it has over previously used technologies with regard to the social or environmental impact of the business.

Total 12 marks
Question 5

From Table 4 below, choose one agricultural or horticultural business that you are familiar with in terms of its business management. Show your choice by placing a tick in the box next to it.

Table 4. Selected business types

<table>
<thead>
<tr>
<th>Cereal cropping</th>
<th>Garden design/construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poultry for meat</td>
<td>Ornamental garden maintenance</td>
</tr>
<tr>
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<td>Horses for recreation</td>
</tr>
<tr>
<td>Turf production</td>
<td>Rearing rabbits for pet or meat market</td>
</tr>
</tbody>
</table>

a. Managers need financial, marketing and production skills to operate a business.

i. List four different production skills needed to operate a business of the type you have chosen.

1. 

2. 

3. 

4. 

ii. Four broad types of risk that can influence the profitability of a business are listed below. In the space provided, describe an example of each type of risk that specifically affects your chosen business type.

<table>
<thead>
<tr>
<th>Type of risk</th>
<th>Example of a risk that specifically affects your chosen business type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental</td>
<td></td>
</tr>
<tr>
<td>Marketing</td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td></td>
</tr>
</tbody>
</table>

4 + 4 = 8 marks
b. i. Describe a quality standard appropriate to your chosen business.

ii. Explain how the business manager would ensure that this standard is achieved.

2 + 3 = 5 marks

c. State two occupational health and safety risks associated with a business of this type.

Risk 1

Risk 2

2 marks

d. For one of the occupational health and safety risks identified in part c, explain in detail how a manager would make sure that it did not become a problem.

3 marks

e. State the main difference between a budget and a cash flow record.

1 mark

Total 19 marks
Question 6
Many managers try to adopt strategies to make their agricultural or horticultural land more closely resemble natural ecosystems.

a. Describe two different strategies a manager could adopt to make an agricultural or horticultural property more closely approximate a natural ecosystem.

Strategy 1

Strategy 2

b. Explain in detail how one of the strategies in part a. may influence the sustainability of the business. Your answer should consider two of the three aspects of environmental, economic and/or social sustainability.

Total 10 marks
Question 7
On the following pages there are four case studies and their questions.
Read the case studies and select one to answer.
In Table 5 (below) place a tick in the box next to the case study you are going to answer.

Table 5. Case studies

<table>
<thead>
<tr>
<th></th>
<th>Case studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ornamental plant nursery (pages 13–15)</td>
</tr>
<tr>
<td>2</td>
<td>Grazing property (pages 16–18)</td>
</tr>
<tr>
<td>3</td>
<td>Intensive animal production (pages 19–21)</td>
</tr>
<tr>
<td>4</td>
<td>Broad-acre cropping (pages 22–24)</td>
</tr>
</tbody>
</table>

(Answer only one case study.)
EITHER

Case study 1 – Ornamental plant nursery

Yolanda grows a range of ornamental plants in a field. They are sold as advanced plants that are dug up in winter and sold in root control bags. An automated system of overhead sprinklers is used to water the ‘growing on’ area. The excess irrigation water runs into a dam on a neighbouring property. Algal blooms are becoming a common occurrence in the dam.

Yolanda is concerned about a low-lying section of the field where the advanced plants are growing. All the plants in this section look unhealthy. Their new foliage is stunted and wilted. Even though there has been good rain recently, it looks as though the plants need more water. There is a fine white crystalline substance on the soil surface in the low-lying section of the field.

a. Name and give evidence for two potential environmental degradation issues in this case study.
   i. Issue 1
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________

   ii. Evidence
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________

   iii. Issue 2
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________

   iv. Evidence
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________
   ___________________________

   1 + 2 + 1 + 2 = 6 marks
b. Describe, in detail, integrated management strategies that will solve the environmental degradation on Yolanda’s property.

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5 marks

c. Describe two indicators that could be used to measure the success of the strategies you described in part b.

Indicator 1 __________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

Indicator 2 __________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

4 marks

Question 7 – Case study 1 – continued
d. Describe the steps required to develop a whole property management plan on Yolanda’s property.

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________________________________________________________________________

6 marks

e. Government regulations control many aspects of agricultural and horticultural businesses.
   i. State an issue in the case study that is controlled by a government regulation.

________________________________________________________________________

ii. What is the name of the regulation referred to in part i.?

________________________________________________________________________

iii. Explain how this regulation affects the management of properties like Yolanda’s.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

1 + 1 + 2 = 4 marks

Total 25 marks
Case study 2 – Grazing property

Helga owns a 400-hectare property. She runs 800 head of cattle on this property. The property has two distinct areas. The top part of the property is steep with several gullies and has little tree or shrub cover apart from a weed called gorse, which is not controlled. This drains onto the lower, gently sloped section of the property. The soil on the lower slopes has a large percentage of clay.

Over the last few years the amount of bare soil at the base of the gullies has increased. During the winter months there is an increasing area on the lower slopes that is becoming wet and quite impassable for vehicles. Pasture growth in this area is poor. There is little internal fencing on the property. The property has been very heavily stocked for the last two years and little soil renovation has been done. Cattle have been allowed to graze all areas, including the gullies.

a. Name and give evidence for two potential environmental degradation issues in this case study.

i. Issue 1

ii. Evidence

iii. Issue 2

iv. Evidence

1 + 2 + 1 + 2 = 6 marks
b. Describe, in detail, integrated management strategies that will solve the environmental degradation on Helga’s property.

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5 marks

c. Describe two indicators that could be used to measure the success of the strategies you described in part b.

Indicator 1________________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________________

Indicator 2________________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________________

________________________________________________________________________________________________________________________________________________________

4 marks
d. Describe the steps required to develop a whole property management plan on Helga’s property.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

6 marks

e. Government regulations control many aspects of agricultural and horticultural businesses.

i. State an issue in the case study that is controlled by a government regulation.

_____________________________________________________________________

ii. What is the name of the regulation referred to in part i.?

_____________________________________________________________________

iii. Explain how this regulation affects the management of properties like Helga’s.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

1 + 1 + 2 = 4 marks

Total 25 marks
Case study 3 – Intensive animal production

George has a small piggery with a number of large sheds located on a gentle slope. The pigs have access to pasture during the day, but are housed and supplementary fed at night.

The property has two large paddocks; one above the sheds that is used for hay production and one below that is grazed by the pigs. Effluent from the sheds is stored in a concrete tank and is used to spray irrigate both paddocks. The lower paddock is being grazed unevenly and bare patches are starting to appear.

The water supply for George’s piggery, for both stock water and cleaning, is from a dam at the bottom of the slope. During periods of heavy rain the dam looks muddy and overflows into a local creek. Algal blooms are becoming a common occurrence in the dam and local creek.

a. Name and give evidence for two potential environmental degradation issues in this case study.
   i. Issue 1

   ii. Evidence

   iii. Issue 2

   iv. Evidence

\[1 + 2 + 1 + 2 = 6\] marks
b. Describe, in detail, integrated management strategies that will solve the environmental degradation on George’s property.

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5 marks

c. Describe two indicators that could be used to measure the success of the strategies you described in part b.

Indicator 1  

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________________________________________________________________________

________________________________________________________________________

Indicator 2  

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

4 marks
d. Describe the steps required to develop a whole property management plan on George’s property.

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________________________________________________________________________

________________________________________________________________________

6 marks

e. Government regulations control many aspects of agricultural and horticultural businesses.

i. State an issue in the case study that is controlled by a government regulation.

________________________________________________________________________

ii. What is the name of the regulation referred to in part i.?

________________________________________________________________________

iii. Explain how this regulation affects the management of properties like George’s.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

1 $+ 1 + 2 = 4$ marks

Total 25 marks
Case study 4 – Broad-acre cropping

Ted runs a large broad-acre cropping property. His wheat yields have shown a steady decline over the past few years and yields have remained low even though large amounts of fertiliser have been applied.

The property uses conventional methods of stubble burning and weed eradication by soil cultivation. Over the years the colour of the soil has become paler. Soil has started to build up along fence lines. The soil was recently found to have a pH of 4.0. Runoff from the property drains into a neighbouring wetland. This wetland is increasingly experiencing algal blooms.

a. Name and give evidence for two potential environmental degradation issues in this case study.
   i. Issue 1
   
   ii. Evidence
   
   iii. Issue 2
   
   iv. Evidence

1 + 2 + 1 + 2 = 6 marks
b. Describe, in detail, integrated management strategies that will solve the environmental degradation on Ted’s property.

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________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

5 marks

c. Describe two indicators that could be used to measure the success of the strategies you described in part b.

Indicator 1 _______________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Indicator 2 _______________________________________________________________________

________________________________________________________________________

4 marks
d. Describe the steps required to develop a whole property management plan on Ted’s property.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

6 marks

e. Government regulations control many aspects of agricultural and horticultural businesses.
   i. State an issue in the case study that is controlled by a government regulation.

________________________________________________________________________

ii. What is the name of the regulation referred to in part i.?

________________________________________________________________________

iii. Explain how this regulation affects the management of properties like Ted’s.

________________________________________________________________________

________________________________________________________________________

1 + 1 + 2 = 4 marks

Total 25 marks

END OF QUESTION AND ANSWER BOOK