AGRICULTURAL AND HORTICULTURAL STUDIES

Written examination

Monday 12 November 2012

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 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 16 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. Write using black or blue pen.

Question 1
a. Animal and plant environments can be modified in many ways to improve production.
   For each of the following, state two ways to
   i. maximise the birthing percentages of livestock
      1. 
      2. 
   ii. maximise the germination of seeds
      1. 
      2. 
   iii. minimise the turbidity of water in a dam that is used for stock drinking water.
      1. 
      2. 

   2 + 2 + 2 = 6 marks

b. The moisture content of potting mix or soil influences how well a plant grows. Apart from adding water to
   change the moisture content, list three modifications to potting mix or soil that may be implemented to get the
   best growing conditions for plants.
   1. 
   2. 
   3. 

   3 marks
c. List three things that a manager can do to ensure that hothouse grown plants have the optimum environment for production.

1. 

2. 

3. 

3 marks

d. List three things that a manager can do to ensure that intensively managed animals (such as those in feed lots, cages or pens) have the optimum environment for production.

1. 

2. 

3. 

3 marks
Question 2
In Victoria there are several weeds of concern to agriculture, horticulture and the environment. Examples of these are given in Table 1.

Table 1. Examples of weeds of concern in Victoria

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific name</th>
</tr>
</thead>
<tbody>
<tr>
<td>annual ryegrass/Wimmera rye</td>
<td><em>Lolium rigidum</em></td>
</tr>
<tr>
<td>blackberry</td>
<td><em>Rubus fruticosus</em> aggregate</td>
</tr>
<tr>
<td>gorse/furse</td>
<td><em>Ulex europaeus</em></td>
</tr>
<tr>
<td>ragwort</td>
<td><em>Senecio jacobaea</em></td>
</tr>
<tr>
<td>serrated tussock</td>
<td><em>Nassella trichotoma</em></td>
</tr>
<tr>
<td>St John’s wort</td>
<td><em>Hypericum perforatum L.</em> Family Clusiaceae</td>
</tr>
</tbody>
</table>

a. Weed seeds are spread in a variety of ways.
   i. In Table 1 there are two weeds for which wind is a major way in which the seeds are spread. Name these two weeds.

   1. ____________________________
   2. ____________________________

   ii. List three distinctly different ways, other than wind, in which weed seeds are spread.

   1. ____________________________
   2. ____________________________
   3. ____________________________

   $2 + 3 = 5$ marks
b. Choose a weed from Table 1.

name of your chosen weed _______________________________________

You are going to be absent from your property for a year and you need to tell the manager how to deal with this weed. The manager has limited experience in this region, so it is important to give as much information as possible. You should include measures to avoid infestation and spread of the weed, and time-specific calendar details.

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________

5 marks
### Question 3

#### Table 2. Examples of pests and diseases of concern in Victoria

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific name</th>
<th>Animal or plant it affects (host)</th>
</tr>
</thead>
<tbody>
<tr>
<td>aphids</td>
<td>assorted species</td>
<td>3</td>
</tr>
<tr>
<td>footrot</td>
<td><em>Dichelobacter nodosus</em></td>
<td>sheep, goats, horses, cattle</td>
</tr>
<tr>
<td>grass tetany</td>
<td></td>
<td>sheep, goats, cattle</td>
</tr>
<tr>
<td>intestinal worms (ruminants)</td>
<td>assorted species</td>
<td>cattle, sheep, goats</td>
</tr>
<tr>
<td>cattle lice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sheep lice</td>
<td><em>Linognathus vituli</em></td>
<td>cattle</td>
</tr>
<tr>
<td>equine lice</td>
<td><em>Bovicola bovis</em></td>
<td>sheep, horses</td>
</tr>
<tr>
<td>chicken body lice</td>
<td><em>Haematopinus asini</em></td>
<td>horses</td>
</tr>
<tr>
<td></td>
<td><em>Menacanthus stramineus</em></td>
<td>fowl</td>
</tr>
<tr>
<td>intestinal worms (ruminants)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sheep lice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>equine lice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>chicken body lice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stem and bulb nematodes</td>
<td><em>Ditylenchus dipsaci</em></td>
<td>4</td>
</tr>
<tr>
<td>mastitis</td>
<td>N/A</td>
<td>cattle, sheep, goats</td>
</tr>
<tr>
<td>Avian paramyxovirus</td>
<td></td>
<td>poultry</td>
</tr>
<tr>
<td>stem and bulb nematodes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mastitis</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Avian paramyxovirus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**a.** Place the appropriate common name, scientific name or host next to the numbers 1–4 in Table 2 above.

4 marks

**b.** Choose one pest or disease from Table 2.

**name of your chosen pest or disease __________________________**

Use the following questions to describe a management strategy to prevent and/or control your chosen pest or disease.

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

________________________________________________________________________

________________________________________________________________________
ii. How would you monitor the stage of development or extent of this pest or disease?

iii. Explain how the source of this pest or disease is controlled. Include in your answer how the host’s environment can be managed so that it does not favour the pest or disease species.

iv. Suggest at least two methods of control that may be used to treat this pest or disease.

v. Explain the appropriate timing (critical timing) of the methods of control to effectively manage this pest or disease.

1 + 1 + 2 + 2 + 2 = 8 marks
**Question 4**

From Table 3 select **two** technological areas for which you know an example of new or emerging technologies. Show your selection by writing the number 1 and the number 2 next to your chosen technological areas.

**Table 3. Technological areas**

<table>
<thead>
<tr>
<th>biotechnology</th>
<th>biological control</th>
</tr>
</thead>
<tbody>
<tr>
<td>reproduction manipulation</td>
<td>genetic manipulation</td>
</tr>
<tr>
<td>plant or animal breeding</td>
<td>alternative energy sources</td>
</tr>
<tr>
<td>chemical pest or disease control</td>
<td>resource management methods</td>
</tr>
<tr>
<td>information and communications innovation</td>
<td>Global Positioning System (GPS) technology</td>
</tr>
<tr>
<td>precision agriculture/horticulture</td>
<td>radiation usage</td>
</tr>
<tr>
<td>alternative materials</td>
<td>environment or system modelling</td>
</tr>
</tbody>
</table>

**a.** Technological area number 1

i. Name an innovation applicable to this technological area and describe how it works.

   innovation ____________________________
   description ____________________________
   ______________________________________
   ______________________________________
   ______________________________________

ii. For this technology, explain the advantages and disadvantages it has over previously used technologies with regard to the sustainability of a business.

   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________
   ______________________________________

   2 + 4 = 6 marks
b. Technological area number 2
   i. Name an innovation applicable to this technological area and describe how it works or how it is done.
      
      **innovation**

      **description**

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

      
      
      
      
      
      
      
      
      
      
      
      
      
      
      
      
      
      
      
      
      

      \[2 + 4 = 6\] marks
Case studies

Issues of environmental degradation need to be considered in the management of agricultural and horticultural enterprises. Choose one of the following two case studies, either Case study A or Case study B, and answer the questions for that case study only.

Tick (✓) your chosen case study.

Case study A  page 10

or

Case study B  page 12

EITHER

Case study A – Ornamental plant nursery

Jordan 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 area. The excess irrigation water runs into a dam on a neighbouring property. Algal blooms are becoming a common occurrence in the dam.

Jordan 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 of two potential environmental degradation problems in this case study.

   problem 1

   evidence

   problem 2

   evidence

6 marks
b. Describe, in detail, management strategies to fix these environmental degradation problems on Jordan’s property.

strategies for fixing problem 1

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

strategies for fixing problem 2

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

8 marks

c. Describe indicators for these environmental degradation problems that could be used to measure the success of the strategies you described in part b.

indicator for problem 1

________________________________________________________________________

________________________________________________________________________

indicator for problem 2

________________________________________________________________________

________________________________________________________________________

2 marks

d. One of Jordan’s management practices is illegal. Briefly describe the practice that is illegal.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2 marks
e. In 1994, the Victorian Parliament passed an Act relevant to agricultural and horticultural business owners’ responsibilities.

Give the full name of this Act and give two reasons why it is important.

name of Act

reason 1

reason 2

3 marks

OR

Case study B – Dairy

Susan and John own a small dairy, with their yards, sheds and effluent pond on the side of a hill. They also own flat land along an adjoining creek where they irrigate lucerne for feed supplements for their farm and surrounding farmers’ cattle.

The paddocks above the dairy are used for grazing the dairy cattle while they are being supplementary fed between milkings.

When it rains heavily, both run-off from the top paddocks and overflow from the effluent pond go down the hill, onto the lower paddocks and into the creek.

Algal blooms are becoming a common occurrence in the creek and, in warm weather, there is often a fine, white, crystalline substance on the tracks around the irrigated flats.

a. Name and give evidence of two potential environmental degradation problems in this case study.

problem 1

evidence

problem 2

evidence

6 marks
b. Describe, in detail, management strategies to fix these environmental degradation problems on the property.

strategies for fixing problem 1


strategies for fixing problem 2


8 marks

c. Describe indicators for these environmental degradation problems that could be used to measure the success of the strategies you described in part b.

indicator for problem 1


indicator for problem 2


2 marks

d. One of Susan and John’s management practices is illegal. Briefly describe the practice that is illegal.


2 marks
e. In 1994, the Victorian Parliament passed an Act relevant to agricultural and horticultural business owners’ responsibilities. Give the full name of this Act and give two reasons why it is important.

name of Act ____________________________________________________________

reason 1 __________________________________________________________________________________________________________

reason 2 __________________________________________________________________________________________________________

3 marks

Question 6
Agricultural and horticultural businesses contribute to climate change through their greenhouse gas emissions.

a. Name three greenhouse gases and name a process by which agriculture or horticulture contribute to net emissions of each gas.

  greenhouse gas 1 ____________________________________________________________
  contributing process for greenhouse gas 1 ______________________________________

  greenhouse gas 2 __________________________________________________________
  contributing process for greenhouse gas 2 ______________________________________

  greenhouse gas 3 __________________________________________________________
  contributing process for greenhouse gas 3 ______________________________________

6 marks

b. What management strategy could be introduced to an agricultural or horticultural business to reduce its net emission of one greenhouse gas without compromising profitability?

________________________________________________________________________

________________________________________________________________________

2 marks
Question 7
Choose one agricultural or horticultural business that you are familiar with in terms of its business operation.

name of your selected business type ________________________

a. Consider what the business does.
   i. Who is the main purchaser of the product(s) or service(s) from the business?
   __________________________________________________________

   ii. What are the main inputs to this enterprise?
       _________________________________________________________

   iii. What are the main processes of this enterprise? Provide at least two processes.
       _________________________________________________________
       _________________________________________________________

   iv. What are the main outputs of this enterprise?
       _________________________________________________________

   1 + 1 + 2 + 1 = 5 marks

b. What documentation would need to be produced to convince a lender to provide finance for the business?
   _________________________________________________________
   _________________________________________________________
   _________________________________________________________
   _________________________________________________________
   _________________________________________________________

   3 marks

c. Design a strategy that would help to maintain the quality of the business’s product(s) or service(s) in order to meet market expectations with regard to quality.
   _________________________________________________________
   _________________________________________________________
   _________________________________________________________
   _________________________________________________________

   3 marks
d. Explain the methods used to analyse the financial performance of the business.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

3 marks

e. Explain how the ecological impact of the business could be calculated.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

3 marks

f. Climate change may impact on your business and require changes to its operations to ensure sustainable profitability. Complete an analysis on introducing one innovation to address the impact of climate change on your chosen business type. In your response, analyse the strengths, weaknesses, opportunities and threats presented by introducing the innovation.

i. name of innovation ________________________________

ii. strengths ______________________________________

________________________________________________________________________

weaknesses ______________________________________

________________________________________________________________________

opportunities ____________________________________

________________________________________________________________________

threats _________________________________________

________________________________________________________________________

1 + 4 = 5 marks