AGRICULTURAL AND HORTICULTURAL STUDIES

Written examination

Wednesday 5 November 2003

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>4</td>
<td>4</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 15 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 electronic communication devices into the examination room.

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Question 1
From the list provided in Table 1, choose the pest or disease that you are most familiar with by placing a tick in the appropriate box.

Table 1. Selected pests or diseases

<table>
<thead>
<tr>
<th>Ringworm</th>
<th>Powdery mildew</th>
<th>Coccidiosis</th>
<th>Black spot</th>
<th>Liver flukes</th>
<th>Cabbage moth</th>
<th>Botflies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem and root rot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Crown gall</td>
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<tr>
<td>Itch mite</td>
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<td></td>
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<tr>
<td>Aphids</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Hydatids</td>
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</tr>
</tbody>
</table>

a. What specific type of agricultural or horticultural enterprise is most affected by the pest or disease you have chosen?

b. Explain what your chosen pest or disease does to plants or animals to reduce production quality or quantity.

c. Pest and disease prevention lowers the chance of an enterprise being affected by a pest or disease. Quarantine is a pest and disease prevention method that keeps healthy plants or animals separate from affected ones.

Besides quarantine, list one other method of preventing the pest or disease you have chosen from becoming a problem.
d. Pest and disease **control** is used to stop pests and diseases when they occur. **Eradication** is a control method that destroys the affected plants or animals. Besides eradication, list one other method of controlling the pest or disease you have chosen when it has become a problem.

[Blank space]

1 mark

e. Integrated Pest Management (IPM) is used to manage pest or disease problems. List the main components of IPM.

[Blank space]

[Blank space]

[Blank space]

[Blank space]

[Blank space]

[Blank space]

[Blank space]

[Blank space]

[Blank space]

[Blank space]

[Blank space]

3 marks
Total 9 marks
Question 2
John is a landscape gardener. He has been asked to design and build a garden in a newly constructed retirement village in Melbourne. The garden is for the residents of the village and for community functions throughout the year.

John inspects the site for the garden and notes the following.

- A 1.5 metre high brick wall surrounds the site.
- The garden will be fully exposed to the sun in the north, except where the walls cast shadows around the edge.
- There is a large, mature deciduous flowering tree next to the south wall of the site. This tree must be carefully managed as it is listed on the Victorian Significant Tree Register.
- The soil in the garden site was compacted during the village construction.
- The builder has roughly filled the site with clay-loam soil from another construction site.
- The site is located in a cool climate area with high rainfall that falls mainly in winter. The summer months are very dry.
- To save money, once the garden is built, the elderly residents of the village want to maintain the garden.

a. List five things John should consider when deciding what type of plants to put in the garden.

i. 

ii. 

iii. 

iv. 

v. 

5 marks

b. Describe four ways that the large deciduous tree will influence the environment for plant growth in the garden.

i. 

ii. 

iii. 

iv. 

8 marks
c. Describe what John should do to solve each of the following soil problems to make the soil suitable for healthy plant growth.

i. The soil below the clay-loam topsoil is compacted.

ii. The clay-loam topsoil has many weed seeds in it.

3 + 3 = 6 marks

d. Recommend the best organisation to help John solve the soil problems and maintain sustainability of this garden. Give three reasons why it is the best organisation to help solve the soil problem.

Recommended organisation

Reasons for the recommendation

i. 

ii. 

iii. 

3 marks
e. Describe one thing John should do to make the garden *environmentally* sustainable.

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2 marks
Total 24 marks
Question 3
Kim has purchased a 200 hectare grazing and cropping property in Western Victoria. The property has the following features.

- It is in a high rainfall area (greater than 500 mm).
- The main winter crop grown is wheat.
- Wheat has been grown using a rotation of three years crop and one year of pasture for the past 60 years.
- All crop stubble has been burnt in the field after harvest.
- Desmond Creek, a significant permanent waterway, runs through the property.
- Three hectares of remnant vegetation remain on the property in a number of small pockets linked together by the creek.

Kim is concerned about the sustainability of the farm. In the coming year, Kim wants to work on three problems.

- The main wheat paddocks are not providing the yield that they did in the past.
- The remaining three hectares of remnant vegetation need protecting.
- The banks (riparian zone) of Desmond Creek are being degraded.

Kim has asked for suggestions to help solve the problems.

a. One suggestion was to grow a legume crop in rotation with the wheat. Explain one benefit of doing this.

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________________________________________________________________________

3 marks

Question 3 – continued
TURN OVER
b. Another suggestion was that, after harvest, the wheat stubble should be kept to turn into the soil at the next cultivation. Explain **one** benefit of doing this.

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

3 marks

c. The practice of ‘minimum tillage’ was also suggested to Kim.
   i. Describe what is meant by minimum tillage.
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________

ii. Explain the benefits of minimum tillage.
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________

2 + 3 = 5 marks
d. Kim found two types of fertiliser in the shed. One had an NPK content of 21:6:10 (high N) and the other had a content of 13:13:21 (high K).

i. State what the letters NPK mean.

ii. Which fertiliser should Kim use on the pasture? Include a reason for your choice in your answer.

3 + 2 = 5 marks
The Department of Sustainability and Environment has told Kim that excessive use of artificial fertilisers year after year is causing soil and water degradation.

i. What is the most likely soil degradation problem?

What macronutrient is causing this problem?

How would the extent of the problem be monitored?

ii. What is the most likely water degradation problem?

What macronutrient is causing the problem?

How would the extent of the problem be monitored?

3 + 3 = 6 marks
f. Protecting both the remnant vegetation and the banks (riparian zone) of Desmond Creek is important to Kim.

i. Explain why these areas are important to maintain.

ii. List three things Kim needs to do to preserve these areas.

1. 

2. 

3. 

3 + 3 = 6 marks

3 + 3 = 6 marks

6 marks

Total 34 marks

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g. A farm consultant has advised Kim to develop a whole farm plan for the property. Describe the stages of developing a whole farm plan.
Question 4
Many activities are required to efficiently produce crops, animals, plants or gardens. Choose the enterprise type in Table 2 that you are most familiar with by placing a tick in the appropriate box.

Table 2. Selected agricultural or horticultural enterprises

<table>
<thead>
<tr>
<th>Growing a wheat crop</th>
<th>Rearing cattle for the beef market</th>
<th>Producing milk for the whole milk market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish or yabby breeding</td>
<td>Designing or maintaining a garden</td>
<td>Growing flowering plants in a glasshouse</td>
</tr>
<tr>
<td>Managing trees to produce a crop of fruit</td>
<td>Managing vines to produce a crop of grapes</td>
<td>Growing a vegetable, herb or flower crop</td>
</tr>
<tr>
<td>Managing poultry for fresh eggs or meat production</td>
<td>Rearing sheep to produce wool</td>
<td>Container growing of ornamental plants</td>
</tr>
</tbody>
</table>

Answer the following questions with regard to the enterprise type you have chosen in Table 2.

a. Describe in point form, and in the correct order, the activities involved in your selected enterprise.

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____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
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____________________________________________________________________________________
b. Most enterprises require ‘specialist’ equipment or machinery. Specialist means that the machinery, equipment or tool is only of use to a group of similar enterprises. A tractor is not a specialist item of equipment because it is used by many different enterprises.

List two items of specialist machinery, equipment or tools needed for the enterprise type you have chosen in Table 2, and describe what they are used for.

i. Name of machinery, equipment or tool

What is it used for?

ii. Name of machinery, equipment or tool

What is it used for?

3 + 3 = 6 marks

c. Explain how you would monitor the economic sustainability of the enterprise type you have chosen in Table 2.

3 marks
d.  i. Name the type of environmental degradation that the enterprise type you have chosen in Table 2 is **most** likely to cause.

ii. Describe how to monitor if this degradation is becoming a problem.

1 + 3 = 4 marks
e. On Table 3, choose (by placing a tick in the appropriate box) an area of technological development that has affected the enterprise you chose in Table 2.

Table 3. Areas of technological developments

<table>
<thead>
<tr>
<th>Biological pest or disease control</th>
<th>Chemical pest or disease control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic manipulation</td>
<td>Innovation in resource management</td>
</tr>
<tr>
<td>Alternative energy sources</td>
<td>Remote sensing</td>
</tr>
<tr>
<td>Reproduction manipulation</td>
<td>Plant or animal breeding</td>
</tr>
<tr>
<td>Communication innovation</td>
<td>Radiation use</td>
</tr>
</tbody>
</table>

i. Describe, giving a specific example, how the area of technological advancement you chose has been applied to the type of enterprise you have chosen.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

ii. What are two advantages of the technology?

1. _______________________________________________________________________
________________________________________________________________________

2. _______________________________________________________________________
________________________________________________________________________

iii. What are two disadvantages of the technology?

1. _______________________________________________________________________
________________________________________________________________________

2. _______________________________________________________________________