VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Victorian Certificate of Education 2006

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER

Figures									Letter
Words									

AGRICULTURAL AND HORTICULTURAL STUDIES

Written examination

Wednesday 1 November 2006

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

Number of questions	*Number of questions to be answered*	*Number of marks*
6	6	100

- 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 28 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.

In **Question 6**, choose only **one** case study and answer the questions. There are five case studies to choose from.

Question 1

a. Plant and animal environments may be modified in many ways to improve production.

Specify one way each of the following changes could be made.

i. Increase the temperature of a glasshouse

_____

ii. Decrease the humidity in a crop

_____

iii. Increase the drainage of a clay soil

_____

iv. Increase the water-holding capacity of a potting mix or soil

_____

v. Reduce the wind chill on sheep in a paddock

_____

vi. Increase the air-filled porosity of a potting mix or soil

_____

vii. Improve the structure of a compacted soil

_____

viii. Increase the pH of a soil or potting mix

_____

8 marks

b. Often there are a number of ways to modify a specific aspect of a plant or animal's growing environment.

i. What are the advantages and disadvantages of using a nitrogen fertiliser application instead of a clover/lucerne pasture crop to improve a soil's nitrogen availability for future crops?

ii. What are the advantages and disadvantages of mulching with wood chips instead of using plastic sheeting between ornamental plants to conserve soil moisture?

3 + 3 = 6 marks

Total 14 marks

Question 2

a. Choose a pest **or** disease from the list provided in Table 1. Indicate your choice by placing a **tick** in the appropriate box.

Table 1. Selected pests and diseases

Diseases	
mosaic virus	
damping off	
downy mildew	
grass tetany	
pulpy kidney	
Newcastle disease	

Pests	
lice	
red-legged earth mite	
rabbits	
sheep blow fly	
aphids	
slugs	

i. Name a specific agricultural or horticultural industry that the pest or disease affects.

ii. Explain how a manager would **prevent** your chosen pest or disease from occurring.

iii. Explain how a manager would **treat** your chosen pest or disease when it does occur.

1 + 3 + 3 = 7 marks

b. Weeds can be a problem for all agricultural and horticultural businesses. Government legislation controls the management of some weeds.

i. State **three** ways weeds reduce production in an agricultural or horticultural business.

ii. Blackberry (*Rubus fruticosus*) is a regionally controlled declared noxious weed. What does this mean for landowners with blackberry on their property?

iii. Choose a weed that you are familiar with from Table 2. Indicate your choice by placing a tick in the appropriate box.

Table 2. Selected weeds

Weeds	
oxalis (*Oxalis spp.*)	
blackberry (*Rubus fruticosus*)	
Paterson's curse (*Echium plantagineum*)	
Cape weed (*Arctotheca calendula*)	
wild oats (*Avena fatua*)	
serrated tussock (*Nassella trichotoma*)	

Describe an integrated management strategy for your selected weed.

3 + 1 + 3 = 7 marks

Total 14 marks

TURN OVER

Question 3

Table 3. Selected agricultural and/or horticultural practices

Practices	
modifying climate	
modifying soil/growing media	
modifying topography	
water management	
soil management	
controlling weeds, pests and diseases	
decision making	
managing animals and their products	
managing plants and their products	

a. From the list in Table 3 select **two** practices for which there are innovations (**new or emerging** technologies, methods or developments) that you are familiar with. Place a tick in the box next to each selection.

i. Name an innovation used in one of the practices selected from Table 3 and describe how it works or how it is done.

Name _____

Description _____

_____

_____

_____

_____

_____

_____

ii. Name an innovation used for the other practice you selected from Table 3 and describe how it works or how it is done.

Name _____

Description _____

_____

_____

_____

_____

_____

_____

(1 + 3) + (1 + 3) = 8 marks

b. For **one** of the innovations you described in **part a.** of this question, explain the advantages and disadvantages it has over previously used technologies.

3 marks

c. For the innovation you described in **part b.** above, explain the effect it will have on businesses that use it.

3 marks

Total 14 marks

Question 4

Table 4. Selected business types

cereal cropping		design/construct a garden	
poultry for meat		maintain an ornamental garden	
poultry for eggs		plants in glasshouse	
beef cattle		container-growing of ornamentals	
pigs		field-growing vegetables, herbs or flowers	
sheep		production of indigenous plants	
dairy cows		hydroponic production	
grape vines		fruit tree management	
fish or yabbies		horses for recreation	

From Table 4, choose an agricultural or horticultural business that you are familiar with in terms of its business management. Place a tick in the box next to your selection.

a. List **four** different aspects that need to be considered when developing a business plan for your chosen business type.

4 marks

b. List **four** different aspects of your chosen business type that should be regularly monitored to ensure the business is operating successfully.

4 marks

c. Explain how a manager of your chosen business type could ensure quality control.

3 marks

d. Managers are unable to control all the things that influence the sustainability of a business.

i. List **three** factors that could affect sustainability of your chosen business type that the manager **cannot** control.

ii. For **one** of the factors listed in **i.** above, explain how you would minimise its risk to the sustainability of the business.

3 + 3 = 6 marks

e. Explain how the sustainability of your chosen business type should be evaluated.

3 marks

Total 20 marks

Question 5

Soil acidification

Soil acidification affects many areas of Victoria.

a. Describe **two** different land management practices that often lead to an increase in soil acidification.

i. _____

_____

_____

_____

_____

_____

ii. _____

_____

_____

_____

_____

_____

2 + 2 = 4 marks

b. Explain **two** ways the sustainability of a business is reduced by soil acidification.

i.

ii.

3 + 3 = 6 marks

c. Describe one method of treating and one method of preventing soil acidification.

i. Treating soil acidification

ii. Preventing soil acidification

2 + 2 = 4 marks

Total 14 marks

Question 6

On the following pages there are five case studies (Table 5) and their questions.

It is suggested that you read the **two** case studies you are most familiar with, then **select one** and answer the questions.

In Table 5 (below), **place a tick** in the box next to the case study that you are going to answer. (Answer only **one** case study. If you answer more, only the first one in the book will be marked.)

Table 5. Case studies

	Title	
1	Field- or container-grown plants (Pages 14–16)	
2	Organic or non-organic crop management (Pages 17–19)	
3	Shed-fed or open-grazed animal production (Pages 20–22)	
4	Free-range or shed production (Pages 23–25)	
5	Pasture management alternatives (Pages 26–28)	

EITHER

Case study 1 – Field- or container-grown plants

Tran has a plant nursery growing English box (*Buxus sempervirens*). Most of the plants are grown and sold in 150 mm diameter pots. Some are planted out in rows in the field and allowed to grow larger.

The potted stock is kept on a gravel growing-on area. Drainage pipes in the gravel take any excess irrigation water off the property to a roadside drain.

The field-grown plants are grown on a slight slope that has a dam at its base. Water is pumped from this dam to irrigate the plants by overhead sprinklers. Weeds are controlled by regular cultivation between the rows.

Recently a problem has developed with the water in the dam. It is a muddy colour. The colour is worse after it rains.

a. Discuss the advantages and disadvantages of growing plants in containers compared to growing them in the field.

5 marks

b. Identify one change Tran could make to the drainage in the gravel growing-on area to make it more sustainable.

1 mark

c. Tran is keen to make sure that the small business is sustainable.

i. What is the most probable cause of the muddy water?

ii. Describe one way of **treating** the muddy water to make it clearer.

iii. Explain two management practices Tran could use to **prevent** the muddy water problem.

Management practice 1

Management practice 2

1 + 1 + (3 + 3) = 8 marks

d. Tran is concerned with looking after the **land and water** resources of the property.

i. List two environmental indicators Tran should monitor for the field-grown plants.

Environmental indicator 1 _____

_____

Environmental indicator 2 _____

_____

ii. Describe what each of these indicators measures.

Environmental indicator 1 _____

_____

_____

_____

Environmental indicator 2 _____

_____

_____

_____

(1 + 1) + (2 + 2) = 6 marks

e. Government regulations (Acts) exist concerning management of natural resources on privately owned land.

i. Name one such regulation (Act) of which Tran should be aware.

_____

_____

_____

ii. Describe what effect this regulation (Act) has on the management of businesses such as Tran's.

_____

_____

_____

_____

_____

_____

1 + 3 = 4 marks

Total 24 marks

End of Case study 1

OR

Case study 2 – Organic or non-organic crop management

Bruce owns a small vineyard and winery. The winery and associated buildings are located at the top of a small water catchment. Water runoff from the buildings and surface runoff from the winery are diverted away from the catchment to a nearby roadside drain.

The vines are grown on a slight slope that leads away from the buildings to a dam at its base. Water is pumped from this dam to irrigate the vines by overhead sprinklers. Weeds are controlled by regular cultivation between the rows of vines.

Bruce is concerned about a problem with the water in the dam. It is a muddy colour. The colour is worse after it rains.

The vineyard has been established with conventional, non-organic methods. Bruce is thinking of changing to organic methods to grow the vines.

a. Discuss the advantages and disadvantages of conventional, non-organic methods of growing crops compared to organic production.

5 marks

b. Identify one change Bruce could make to the runoff from the winery and building area to make the business more sustainable.

1 mark

c. Bruce is keen to make sure that the small business is sustainable.

i. What is the most probable cause of the muddy water?

ii. Describe one way of **treating** the muddy water to make it clearer.

iii. Explain two management practices Bruce could use to **prevent** the muddy water problem.

Management practice 1

Management practice 2

1 + 1 + (3 + 3) = 8 marks

d. Bruce is concerned with looking after the **land and water** resources of the property.

i. List two environmental indicators Bruce should monitor for the conventional non-organic vineyard.

Environmental indicator 1 _____

_____

Environmental indicator 2 _____

_____

ii. Describe what each of these indicators measures.

Environmental indicator 1 _____

_____

_____

_____

Environmental indicator 2 _____

_____

_____

_____

(1 + 1) + (2 + 2) = 6 marks

e. Government regulations (Acts) exist concerning management of natural resources on privately owned land.

i. Name one such regulation (Act) of which Bruce should be aware.

_____

_____

ii. Describe what effect this regulation (Act) has on the management of businesses such as Bruce's.

_____

_____

_____

_____

_____

_____

1 + 3 = 4 marks

Total 24 marks

End of Case study 2

OR

Case study 3 – Shed-fed or open-grazed animal production

Sarah has just purchased a dairy farm that has been milking 200 cows. It has not been looked after very well. Next to the dairy is a large shed that had been used for pigs. This shed and the dairy are located at the top of a small water catchment. Water runoff from the sheds is diverted away from the catchment to a nearby roadside drain.

Below the buildings, the catchment has a heavily grazed pasture paddock sloping into a dam. The water from the dam is pumped to the sheds to provide stock water and can be used to irrigate the pasture using a sprinkler system. Recently a problem has developed with the water in the dam. It is a muddy colour. The colour is worse after it rains.

To get the income Sarah needs from the farm she must double the number of cows milked. Sarah is currently trying to increase the stocking rate by increasing pasture production with increased fertiliser and irrigation applications. She is considering limiting the cows' grazing time by housing them in the large shed for part of the time and feeding them purchased feed and dietary supplements.

a. Discuss the advantages and disadvantages of only paddock feeding compared with partial shedding and supplementary feeding.

5 marks

b. Identify one change Sarah could make to the runoff from the shed and dairy area to make the business more sustainable.

1 mark

c. Sarah is keen to make sure that the small business is sustainable.

i. What is the most probable cause of the muddy water?

ii. Describe one way of **treating** the muddy water to make it clearer.

iii. Explain two management practices Sarah could use to **prevent** the muddy water problem.

Management practice 1

Management practice 2

1 + 1 + (3 + 3) = 8 marks

d. Sarah is concerned with looking after the **land and water** resources of the property.

i. List two environmental indicators Sarah should monitor for her paddock-grazed cows.

Environmental indicator 1 _____

_____

Environmental indicator 2 _____

_____

ii. Describe what each of these indicators measures.

Environmental indicator 1 _____

_____

_____

_____

Environmental indicator 2 _____

_____

_____

_____

(1 + 1) + (2 + 2) = 6 marks

e. Government regulations (Acts) exist concerning management of natural resources on privately owned land.

i. Name one such regulation (Act) of which Sarah should be aware.

_____

_____

ii. Describe what effect this regulation (Act) has on the management of businesses such as Sarah's.

_____

_____

_____

_____

_____

_____

1 + 3 = 4 marks

Total 24 marks

End of Case study 3

OR

Case study 4 – Free-range or shed production

Mario has a small poultry farm with a number of large sheds. It is on the edge of a town, within the town boundary. The buildings are located at the top of a small water catchment. Water runoff from the sheds is diverted away from the catchment to a nearby roadside drain.

Below the buildings, the catchment has a heavily grazed pastured paddock sloping into a small dam. The water from the dam is pumped to the sheds to provide stock water and can be used to irrigate the pasture using a sprinkler system. Recently a problem has developed with the water in the dam. It is a muddy colour. The colour is worse after it rains.

Mario runs caged battery hens for egg production. He is considering changing to free-range egg production. The space and sheds are available to run only one of these options.

a. Discuss the advantages and disadvantages of 'free-range' compared with 'caged'/'penned' birds or animals.

5 marks

b. Identify one change Mario could make to the runoff from the shed area to make the business more sustainable.

1 mark

c. Mario is keen to make sure that the small business is sustainable.

i. What is the most probable cause of the muddy water?

ii. Describe one way of **treating** the muddy water to make it clearer.

iii. Explain two management practices Mario could use to **prevent** the muddy water problem.

Management practice 1

Management practice 2

1 + 1 + (3 + 3) = 8 marks

d. Mario is concerned with looking after the **land and water** resources of the property.

i. List two environmental indicators Mario should monitor if he changes to free-range egg production.

Environmental indicator 1 _____

_____

Environmental indicator 2 _____

_____

ii. Describe what each of these indicators measures.

Environmental indicator 1 _____

_____

_____

_____

Environmental indicator 2 _____

_____

_____

_____

(1 + 1) + (2 + 2) = 6 marks

e. Government regulations (Acts) exist concerning management of natural resources on privately owned land.

i. Name one such regulation (Act) of which Mario should be aware.

_____

_____

ii. Describe what effect this regulation (Act) has on the management of businesses such as Mario's.

_____

_____

_____

_____

_____

_____

1 + 3 = 4 marks

Total 24 marks

End of Case study 4

OR

Case study 5 – Pasture management alternatives

Charlie has a small property that is used for agisting horses. It has a shed suitable for housing and grooming horses. The shed is located at the top of a small water catchment. Water runoff from the shed is diverted away from the catchment to a nearby roadside drain.

The catchment has been divided into a number of small paddocks for holding agisted horses. These are above a small dam. The water from the dam is pumped to the shed to provide stock water. It is also used to irrigate the pasture, using a sprinkler system. Recently a problem has developed with the water in the dam. It is a muddy colour. The colour is worse after it rains.

The paddocks have bare patches and some very bad weed infestations. Charlie has been trying to improve this by using fertiliser and herbicide. A local agronomist has suggested that grazing a small number of sheep and young cattle with, or in rotation with, the horses should control the weed problem and maintain a balanced pasture.

a. Discuss the advantages and disadvantages of maintaining a healthy pasture for animals by only using fertiliser and herbicide, compared with rotational grazing using alternative animals.

5 marks

b. Identify one change Charlie could make to the runoff from the shed area to make the property more sustainable.

1 mark

c. Charlie is keen to make sure that the small business is sustainable.

i. What is the most probable cause of the muddy water?

ii. Describe one way of **treating** the muddy water to make it clearer.

iii. Explain two management practices Charlie could use to **prevent** the muddy water problem.

Management practice 1

Management practice 2

1 + 1 + (3 + 3) = 8 marks

d. Charlie is concerned with looking after the **land and water** resources of the property.

i. List two environmental indicators Charlie should monitor when maintaining a pasture for grazing horses by only using fertiliser and herbicide.

Environmental indicator 1 _____

_____

Environmental indicator 2 _____

_____

ii. Describe what each of these indicators measures.

Environmental indicator 1 _____

_____

_____

_____

Environmental indicator 2 _____

_____

_____

_____

(1 + 1) + (2 + 2) = 6 marks

e. Government regulations (Acts) exist concerning management of natural resources on privately owned land.

i. Name one such regulation (Act) of which Charlie should be aware.

_____

_____

ii. Describe what effect this regulation (Act) has on the management of businesses such as Charlie's.

_____

_____

_____

_____

_____

_____

1 + 3 = 4 marks

Total 24 marks

END OF QUESTION AND ANSWER BOOK