

STUDENT NUMBER           Letter

# AGRICULTURAL AND HORTICULTURAL STUDIES

## Written examination

Monday 9 November 2015

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>
11	11	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 correction fluid/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.**

**Instructions**

Answer **all** questions in the spaces provided. Write using black or blue pen.

**Question 1** (6 marks)

An important aspect of agricultural and horticultural operations is to provide optimum growing conditions for plants.

For each of the following methods of improving plant production, suggest one action that could be taken to achieve each change.

Method 1: Greenhouse production

- Reduce the humidity of the greenhouse

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- Provide UV protection for plants in summer

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- Improve moisture capacity in the growing media

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Method 2: Field cropping

- Improve the organic composition of the soil

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- Reduce the effect of wind on a cut flower crop

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- Reduce the effect of soil compaction

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**Question 2** (4 marks)

- a. A sports oval has bare patches with no grass and some yellowing of the grass in certain areas caused by incorrect soil pH.

Describe a plan to fix the pH problem.

2 marks

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- b. The use of a green manure crop, such as legumes, could improve the future productivity of a growing area for a vegetable or cereal crop.

Describe how this can happen.

2 marks

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**Question 3** (7 marks)

Topography can be altered or modified for a number of reasons.

- a. Identify two reasons for modifying farm topography.

2 marks

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

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

- b. Select one of the reasons identified in **part a.** and describe how the modification could be achieved.

2 marks

Reason \_\_\_\_\_

Description \_\_\_\_\_

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- c. Describe the effect that the modification mentioned in **part b.** would have on productivity. In your answer, explain how this would affect sustainable production on a farm. 3 marks

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**Question 4** (6 marks)

Common name of weed	Scientific name
annual ryegrass (also known as Wimmera rye)	<i>Lolium rigidum</i>
blackberry	<i>Rubus fruticosus</i> aggregate
flickweed (also known as common bittercress)	<i>Cardamine hirsuta</i>
gorse/furse	<i>Ulex europaeus</i>
ragwort	<i>Senecio jacobaea</i>
serrated tussock	<i>Nassella trichotoma</i>

- a. Choose a weed from the table above.

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

Describe two effects that your chosen weed has on commercial agricultural or horticultural business production. 2 marks

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

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

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- b. The Victorian *Catchment and Land Protection Act 1994* describes four categories of noxious weeds. The four categories of noxious weeds are:
- state prohibited weeds
  - regionally prohibited weeds
  - regionally controlled weeds
  - restricted weeds.

Choose **one** category of noxious weed.

\_\_\_\_\_

Outline the responsibilities of a landowner in relation to the control and management of your chosen category of noxious weed.

2 marks

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\_\_\_\_\_  
\_\_\_\_\_

- c. Sarah produces oaten hay for the Japanese dairy export hay market. To sell into this market, the oaten hay must be free of any weed seeds or contaminating plant material. Sarah has continuing issues with a number of problem weeds. She also has a developing problem with glyphosate-resistant annual ryegrass in some of her paddocks. (Glyphosate is sold as Roundup.)

Describe two processes that Sarah could use to ensure her oaten hay meets the Japanese market specifications and remains weed free.

2 marks

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

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

**Question 5** (11 marks)

Common name of pest or disease	Scientific name	Animal or plant it affects (host)
aphids	assorted species family: Aphididae	ornamental plants, vegetables
intestinal worms (ruminants)	assorted species	cattle, sheep, goats
Johne's disease	<i>Mycobacterium paratuberculosis</i>	cattle, sheep, goats
leaf rust  one of the following: • wheat rust • barley rust • grapevine rust • rose rust	<i>Puccinia triticina</i>  <i>Puccinia triticina</i> <i>Puccinia hordei</i> <i>Phakopsora euvitis</i> <i>Phragmidium sp.</i>	plants, specifically crops and those grown in nurseries or for horticulture  wheat barley grapevines roses
one of the following: • cattle lice • sheep lice • equine lice • chicken body lice	<i>Bovicola bovis</i> <i>Bovicola ovis</i> <i>Haematopinus asini</i> <i>Menacanthus stramineus</i>	cattle sheep horses fowl
pinkeye (conjunctivitis)	assorted species	cattle, sheep, goats
subacute ruminal acidosis (SARA)		cattle, sheep, goats
western flower thrips	<i>Frankliniella occidentalis</i>	ornamental plants, fruit, vegetables

Choose one pest or disease that you have studied from the table above.

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

a. What specific agricultural or horticultural business does your chosen pest or disease affect? 1 mark

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b. Describe two effects that your chosen pest or disease would have on the agricultural or horticultural business given in **part a**. 2 marks

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

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

c. List three symptoms or signs that would indicate the presence of your chosen pest or disease. 3 marks

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

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

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

d. Describe an integrated pest management strategy for your chosen pest or disease. Outline a management timeline that you could use to efficiently manage or control the chosen pest or disease. What strategies would you use to monitor and record your integrated pest management strategy to see if it is working? 5 marks

Description and management timeline \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Monitoring strategies \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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**Question 6** (14 marks)

An agricultural company is developing a mixed-farming strategy for its business in south-western Victoria. The company specialises in vegetables and beef, but now has plans to expand into dairying. It has recently purchased the dairy property next door.

The purchased property has a number of paddocks, ranging from smaller intensive-grazing paddocks to larger cropping paddocks. The topography is undulating, with a creek running along the boundary between the two properties. The property lacks large trees or shelter belts, but there are some remnant native trees along the creek. Two grazing paddocks near the creek have thistles and nettles present. A bore provides water for stock and some paddocks are regularly irrigated.

The soil types are mainly clay loam and sandy loam. The paddock history indicates that large amounts of nitrogenous fertiliser (urea) have been applied to all paddocks, but crop and pasture yields have been decreasing over time. There are patches within the cropping paddocks of the new farm that stay wet in winter and the pasture has poor, stunted growth.

The water in the creek often becomes stagnant and turns green. In summer, the cows like to cool off in the water and the creek banks become boggy. In the lower regions of the creek, a white substance is evident when the water level decreases. Barley grass is the dominant grass species found in these areas, among other yellowing grasses.

- a. Identify three environmental degradation issues evident in the scenario above and describe an appropriate method to manage and resolve each issue.

6 marks

Issue	Method to manage and resolve the issue
1.	
2.	
3.	

b. Select one method from your response to **part a**. Explain how the success of this method can be measured and indicate the success measures.

5 marks

Method \_\_\_\_\_

Explanation \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Success measures \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

c. The company has completed soil testing across the property and has discovered that the cropping paddocks have been overcropped and the subsoil has a hardpan.

Outline a small-scale trial, based on scientific methodology, that the manager could use to assist in deciding how to rectify the problem.

3 marks

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**Question 7** (12 marks)

- a. Some agricultural and horticultural processes and activities produce greenhouse gases.

Name the major greenhouse gas produced as a result of each of the following processes or activities. 3 marks

Process or activity	Major greenhouse gas produced
the transport of supplies and products to and from agricultural and horticultural businesses	
the digestion process in ruminant animals	
the decomposition of animal urine	

- b. Victoria's climate is expected to change as a result of global warming.

Identify two different changes to Victoria's climate that are expected as a result of global warming. 2 marks

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

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- c. Choose a commercial agricultural or horticultural business that you have studied. Describe how each of the changes given in **part b.** might have an impact on your chosen business. 4 marks

Chosen business \_\_\_\_\_

Impact of change 1 \_\_\_\_\_

\_\_\_\_\_

Impact of change 2 \_\_\_\_\_

\_\_\_\_\_

- d. For the business chosen in **part c.**, describe some management strategies that a manager could introduce to counteract the impact of climate change, while still maintaining production levels. 3 marks

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**Question 8** (12 marks)

New and emerging technologies are found in many areas of agriculture and horticulture.

- a. In the table below, name four new and/or emerging technologies, and provide a description of each, including the business it specifically relates to.

8 marks

Name of technology	Description of technology and related business

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- b. Choose one of the technologies named in **part a.** and identify the technology it has replaced. 1 mark

Chosen technology \_\_\_\_\_

Replaced technology \_\_\_\_\_

- c. Evaluate the impact of the new or emerging technology identified in **part b.** on the sustainability of its related business. 3 marks

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**Question 9** (7 marks)

Choose one type of commercial agricultural or horticultural business from the table below.

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

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

**a.** What is the main product or service that your chosen type of business will provide? 1 mark

\_\_\_\_\_

\_\_\_\_\_

**b.** Describe **four** production processes associated with your chosen type of business. 4 marks

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\_\_\_\_\_

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\_\_\_\_\_

**c.** What are the key quality standards for the final product of your chosen type of business and how are they measured? 2 marks

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**Question 10** (14 marks)

Establishing a commercial agricultural or horticultural business requires extensive preparation and planning. Part of this planning process includes the preparation of a business plan.

- a. What are the main aspects of a business plan? 4 marks

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- b. What methods could be used to analyse the financial performance of a business? 2 marks

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- c. What factors should be considered when choosing a location for a business? 3 marks

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- d. How could government policy and regulations affect the location and production of a business? 2 marks

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**Question 10** – continued  
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