VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

Victorian Certificate of Education 2021

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER | | | | | | | | | | Letter |

AGRICULTURAL AND HORTICULTURAL STUDIES

Written examination

Thursday 28 October 2021

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*
15	15	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 correction fluid/tape.
- No calculator is allowed in this examination.

Materials supplied
- Question and answer book of 17 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.

Question 1 (10 marks)

a. Identify the three dimensions of sustainability. 3 marks

Food provenance is about knowing where food comes from and how it is produced, transported and delivered to consumers.

b. Outline how food provenance relates to the three dimensions of sustainability. 3 marks

c. Explain one challenge and one opportunity for producers with regard to food provenance. 4 marks

Challenge

Opportunity

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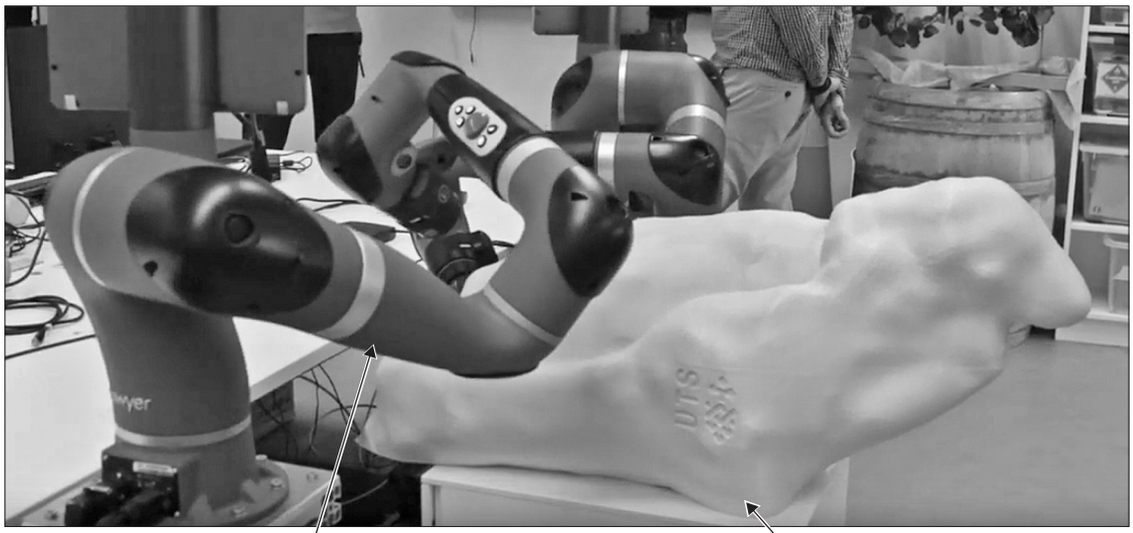
Question 2 (4 marks)

The image below shows a livestock eartag on a sheep (*Ovis aries*).

a. Describe how an eartag for sheep might assist in maintaining property biosecurity. 3 marks

b. Identify **one** way in which biosecurity measures can protect agricultural and/or horticultural industries. 1 mark

Question 3 (8 marks)



Leaders in the Australian wool industry are working to develop robotic technology to help wool growers shear sheep. The robotic technology is being designed to help shearers, not to replace them. Robotic technology has the potential to improve the occupational health and safety of shearers as well as improve the wellbeing of sheep.

The robotic technology that is being developed uses cameras to build a three-dimensional (3D) picture of individual sheep. The robot then uses sensors to adjust its movement as it shears the sheep. To avoid harming real sheep during the testing stages, a 3D model of a sheep is used.

Robotic technology has several potential benefits for wool growers. Robotic technology can enhance the physical and mental wellbeing of shearers by reducing leg and back pain that can result from bending over for long periods. With the robotic technology, shearers can work in a more comfortable upright position.

References: Australian Wool Innovation Limited, <www.wool.com/sheep/agritechnology/wool-harvesting-innovation>; Dominique Schwartz, 'Robots may take on shearing as Australia's resurgent wool industry deals with a labour shortage', ABC News, 18 January 2019, <www.abc.net.au>

Photograph: from Mai Tao, 'Australians developing robotic sheep-shearing system', Robotics & Automation News, 24 January 2019, <https://roboticsandautomationnews.com>; licensed CC-BY 3.0 <https://creativecommons.org/licenses/by/3.0/>

a. Identify **two** advantages of using robotic technology to shear sheep. 2 marks

b. Describe how a wool grower might assess the effectiveness of the robotic technology. 3 marks

c. Describe how robotic technology might have an impact on the Australian food and fibre industries more broadly. 3 marks

Question 4 (4 marks)

Source: rtem/Shutterstock.com

Sow stalls confine pigs in small spaces. Some Australian farmers are voluntarily phasing out the use of sow stalls.

a. Identify one advantage and one disadvantage of farming pigs in sow stalls. 2 marks

Advantage _____

_____

Disadvantage _____

_____

b. Explain how social media and pressure groups might influence a pig farmer to phase out the use of sow stalls. 2 marks

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Question 5 (5 marks)

The Victorian Department of Health and Human Services (DHHS) issued a health warning to horticulturalists who are using potting mix. The ingredients and the dampness of potting mix can create ideal breeding conditions for the microbes that could cause legionnaires' disease, a type of pneumonia.

a. Identify one alternative medium to potting mix that a horticulturalist could use to grow plants and describe two disadvantages of using this alternative medium. 3 marks

Alternative medium _____

Disadvantage 1 _____

_____

Disadvantage 2 _____

_____

b. Outline two positive aspects of using the alternative medium identified in **part a.** in plant production. 2 marks

Positive aspect 1 _____

_____

Positive aspect 2 _____

_____

Question 6 (9 marks)

Reducing the number of animals on any given property is known as running a 'reduced stocking rate'. Reduced stocking rates is an example of sustainable property management that some farmers use to reduce the effects of climate change.

a. Describe how climate change can have an impact on Australia's food and fibre production. 3 marks

b. What indicators and techniques can be used to test and monitor the environmental health of a property? 3 marks

c. Describe how reduced stocking rates might assist in the rehabilitation of land that has been degraded because of climate change. In your answer, detail what changes might be observed on a property as a result of reduced stocking rates. 3 marks

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Question 7 (10 marks)

a. List and describe three sustainable agricultural or horticultural strategies, other than reduced stocking rates, that could reduce the effects of climate change. 3 marks

Strategy 1 _____

_____

Strategy 2 _____

_____

Strategy 3 _____

_____

b. Choose one of the strategies listed in **part a.** and analyse its impact on Australia's food and fibre production. In your answer, state whether this strategy would take a short-term or long-term approach. 3 marks

Strategy _____

_____

_____

_____

_____

c. Choose **another** strategy listed in **part a.** and evaluate how effectively this strategy reduces the effects of climate change and the impact this strategy has on food and fibre industries. 4 marks

Strategy _____

Evaluation _____

_____

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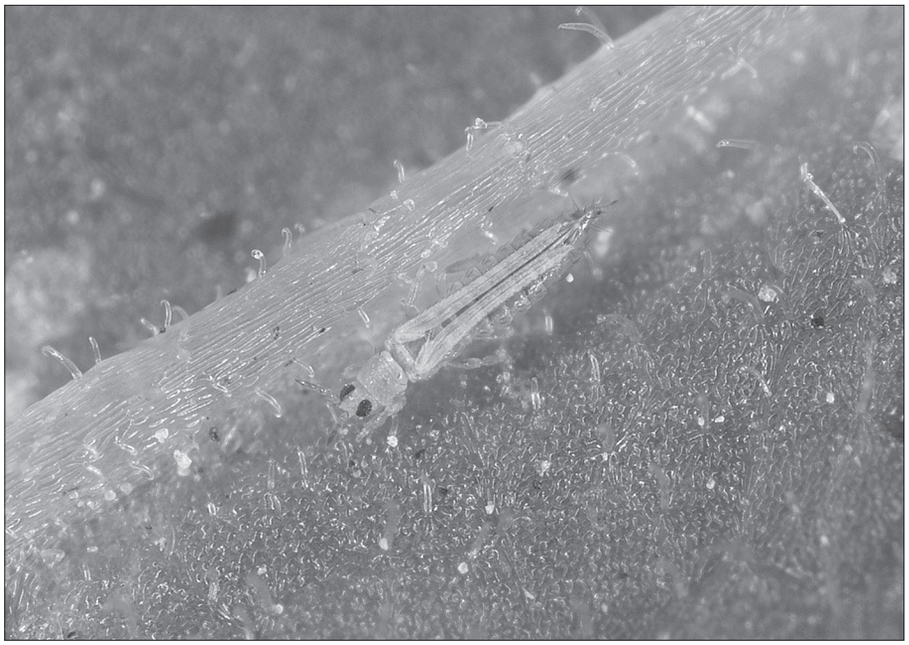
Question 8 (13 marks)

The image below shows a pest that is common in Victoria and that could pose a significant threat to farm production, biosecurity and farm management if left unregulated.



Source: Tomasz Klejdysz/Shutterstock.com

a. Identify the pest shown in the image above. 1 mark

b. Give **one** example of this pest's hosts and explain how this pest would affect this host. 3 marks

c. Describe the impact that this pest might have on food and/or fibre industries. 3 marks

d. **i.** Identify **one** strategy for **controlling** an infestation of this pest and discuss how this strategy might be implemented. 3 marks

ii. Identify **one** strategy to **prevent** an infestation of this pest and discuss how this strategy might be implemented. 3 marks

Question 9 (4 marks)

Genetically modified organisms (GMOs) are a growing presence in Australian food and fibre industries. GMOs can provide benefits for producers and consumers. Some people have expressed concern about the growth of GMOs in the Australian food supply chain. Australian governments are continuing to review and develop public policy in response to the use of GMOs.

Choose one food or fibre industry that you have studied this year, or one that you are familiar with, and discuss **one** advantage and **one** disadvantage of using GMOs for the chosen industry.

Food or fibre industry _____

Discussion _____

Question 10 (6 marks)

Both Victoria and Australia have been exposed to a number of agricultural initiatives that have had drastic consequences. Some past initiatives addressing biosecurity threats have had unforeseen consequences.

One example was the introduction of cane toads (*Bufo marinus*) to Australia in the 1930s. Cane toads were introduced to control cane beetles threatening the sugarcane crop in Queensland. However, the cane toads did not control the cane beetles. Cane toads are poisonous when eaten by other animals and they compete with native animals. Cane toads are now spreading across Australia at a rate of up to 60 km per year.

a. Evaluate the success of the introduction of the cane toad to control cane beetles. 3 marks

b. Identify and describe **one** past agricultural or horticultural initiative that was successful in controlling a biosecurity threat or a problem in Australia. 3 marks

Question 11 (6 marks)

A farmer suspects that their herd of dairy cows has milk fever because some cows cannot stand up, and have a dry muzzle and low calcium levels.

a. Identify and describe **one** strategy that might assist in preventing dairy cows from getting milk fever. 3 marks

b. Identify and describe **one** strategy for controlling milk fever within a herd of dairy cows. 3 marks

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Question 12 (8 marks)

Kim and Ana run a small family farm as a livestock and vegetable business. Kim and Ana have noticed a reduction in their total crop yields and a decline in the growth rates of plants and animals. Suspecting an acidity problem, Kim and Ana have collected several soil samples from their farm and sent them for laboratory analysis, which can be costly.

a. Other than laboratory analysis, describe a technique that Kim and Ana could use to identify acidity problems. 2 marks

b. Describe and explain **one** cause of soil acidification. 3 marks

c. Describe **one** management practice that might improve soil acidity and increase crop yields. 3 marks

Question 13 (3 marks)

Explain how the *Occupational Health and Safety Act 2004* contributes to creating sustainability in agricultural and horticultural businesses.

Question 14 (6 marks)

Remoteness can affect the mental health and wellbeing of farmers and other members of rural and regional communities, more so than financial stress, drought, fire and flood. Mental health professionals and doctors are often not accessible in rural and regional communities.

a. Outline **two** challenges that a lack of access to mental health professionals and doctors might present for farming communities. 2 marks

b. Explain how mental health challenges might be overcome by rural and regional communities. 4 marks

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Question 15 (4 marks)

Source: Mady MacDonald/Shutterstock.com

There is a growing market for a broader range of mushrooms, such as lion's mane, shiitake and oyster, in Australia. Plant-based diets are becoming increasingly popular. Social media has increased the popularity of exotic mushrooms in plant-based diets. However, there is restricted access to exotic mushrooms in retail outlets, with supply limited to farmers' markets, restaurants and cafes.

a. Describe one advantage and one disadvantage for the producer of targeting niche markets such as farmers' markets, restaurants and cafes. 2 marks

Advantage _____

_____

Disadvantage _____

_____

b. Mushrooms can be produced in a growing medium that is a by-product of farming grains and legumes.

Describe how growing mushrooms may be a value-adding activity and may broaden markets for some farmers. 2 marks

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END OF QUESTION AND ANSWER BOOK