



Level 2 Agricultural and Horticultural Science, 2011

90454 Describe manipulations to influence growth and development, and productivity, in livestock or plants

2.00 pm Thursday 24 November 2011 Credits: Four

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

Answer **EITHER:** ALL questions in Section A – Agricultural Science (pages 2–8)

(Tick one box)

OR: ALL questions in Section B – Horticultural Science (pages 10–15).

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–16 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

| ASSESSOR'S USE ONLY Achievement Criteria | | | | | |
|--|---|---|--|--|--|
| Achievement | Achievement with Merit | Achievement with Excellence | | | |
| Describe the effect of factors on growth, development, and productivity of livestock or plants. | Explain how factors influence the growth, development, and productivity of livestock or plants. | Explain how factors influence the growth, development, and productivity of livestock or plants. | | | |
| Describe manipulations of factors used to influence the growth and development, and productivity, of livestock or plants. | Explain how manipulations of factors influence the growth and development, and productivity, of livestock or plants. | Explain how manipulations of factors influence the growth and development, and productivity, of livestock or plants. | | | |
| | | Justify manipulation(s) used to influence growth and development, and the productivity of a livestock or plant production system. | | | |
| Overall level of performance (all criteria within a column are met) | | | | | |

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90454

You are advised to spend 40 minutes answering the questions in this section.

EITHER: SECTION A: AGRICULTURAL SCIENCE

QUESTION ONE: CONTROLLED FEEDING IN INTENSIVE PIG PRODUCTION

Intensive pork production, shown in the photograph below (left), means that pigs are totally dependent on the food supplied to them by the grower, and that target liveweights of 100 kg are met.

An intensive pork production piggery



Ingredient 2:

Feed label giving details of ingredients

| "Weaner Grow Pellets" | | | | |
|---|------------------|--|--|--|
| (5 mm pellets) | | | | |
| For pigs from around 35 kg liveweight to slaughter. | | | | |
| Ingredients selected from : Barley, Bran, Soya bean, Fishmeal, Molasses, Milk powder, Vitamins and Minerals. | | | | |
| Feed Analysis | | | | |
| Energy | 12.2 MJME / kgDM | | | |
| Protein | 16.5% | | | |
| Fats | 1.7% | | | |
| Fibre | 5.4% | | | |

(a) A typical feed label is shown above (right). Describe how TWO of the ingredients on the label affect growth or development.

| Ingredient 1: | | |
|---------------|--|--|
| - | | |
| | | |
| | | |

(b) Explain why feed quality is important when feeding pigs through to 100 kg liveweight by explaining why a pig aged one month is given a feed with 20% protein, while a six-month-old pig is given a feed with 16.5% protein.

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In your answer:

commercial pig production.

(C)

- give an advantage of the feed being in pellet form rather than in a mash or powder form
- explain the importance of **balanced** nutrition for liveweight gain in commercial production
- explain the economic advantages of using formulated feeds in indoor commercial pig production.

Justify the importance placed on using formulated feeds such as "Weaner Grow Pellets" in

QUESTION TWO: IMPACT OF TAILING PRACTICES ON GROWTH/DEVELOPMENT

The photograph below (left) shows merino lambs at tailing. These lambs are from ewes that were run as a mob after mating through to tailing of their lambs. The photograph below (right) shows the tailing process on a high country property.

High country tailing process



Merino lambs at tailing

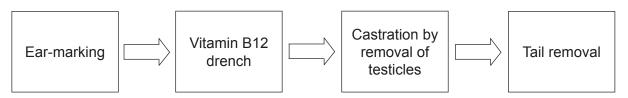


(a) (i) Describe at least TWO factors that could account for the difference in size between the lambs shown in the photograph on the left.

Factor 1: Factor 2:

(ii) Explain how these factors produce the differences in lamb size.

(b) The tailing process shown in the right-hand photograph on page 4 involves a set of actions that is summarised in the diagram below.



Explain how ONE of the actions taken at tailing would cause a **temporary** check to the **growth rate**.

In your answer:

- describe how the action is performed
- explain how the action has a short-term negative effect on growth rate.

(c) Justify not castrating ram lambs as a technique that is more likely to be used by farmers on intensive properties than by farmers on high country properties.

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QUESTION THREE: INTERNAL WORMS AND DRENCHING

Drenching is the main technique used by farmers to reduce the effects that internal parasites, mainly worms, have on growth rates.

(a) (i) Describe how sheep and cattle become infected with internal worms.

(ii) Explain how high internal worm numbers reduce the growth and/or productivity of lambs or calves.

It is recommended that farmers use faecal egg counts when planning drenching and take steps to ensure that all animals receive the required dose when drenching livestock.

(b) Select ONE of the actions associated with drenching:

Faecal egg counts.

OR

Giving all animals the correct dose rate when drenching.

Selected action:_

(i) Describe how the action is carried out.

(ii) Explain how the action is important for controlling intestinal worms to increase livestock productivity.

- Justify the use of a drenching programme based on faecal egg counts rather than a drenching programme based on waiting for livestock to show signs of scouring.
 In your answer, compare:
 - the practical aspects
 - drench effectiveness
 - economic returns from both drenching programmes.

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You are advised to spend 40 minutes answering the questions in this section.

OR:

SECTION B: HORTICULTURAL SCIENCE

QUESTION ONE: CROP PESTS

The cabbage looper caterpillar, shown below (left), and the lettuce aphid, shown below (right), are examples of insect pests that attack lettuces.

The cabbage looper caterpillar
For copyright reasons, this resource
cannot be reproduced here.
Source: http://waggabirds.files.wordpress.com

The lettuce aphid

For copyright reasons, this resource cannot be reproduced here.

Source: http://2.bp.blogspot.com

(a) (i) Describe the damage that a chewing pest such as the cabbage looper caterpillar would cause to plants, and its effect on plant growth.

(ii) Explain how this damage would affect plant processes and plant productivity.

(b) The lettuce aphid is hard to control, because it lives deep inside the heart of the lettuce where few insecticides can reach. In addition, this aphid is showing some resistance to insecticides, particularly in a glasshouse environment. Lettuce aphids also carry a mosaic virus.

A grower decides to burn infected plant material instead of continuing to spray the crop inside the glasshouse.

(i) Describe how burning is used to control pests on lettuces.

(ii) Explain how continued use of pesticides could result in pests developing a resistance to them.

(c) Give reasons why burning is more effective than the use of insecticides for the long-term production of glasshouse lettuces.

QUESTION TWO: HARVESTING CROPS

The climate largely determines the time of harvesting fruit such as apples, grapes, and kiwifruit.

(a) Select a fruit crop you are familiar with.

Selected fruit crop:

(i) Describe features of this fruit crop that indicate that the crop is ready for harvest.

(ii) Explain how specific climatic factors influence these features.

(b) Before a fruit crop is harvested, it should be tested for the features you have described above. The photographs below show tests used on apples (left), and a device used on apples, grapes, and kiwifruit (right), to determine the best harvesting time.

The starch test on apples cut in half





| (i) | Describe how a test is performed to find the correct harvest time. | |
|-----|--|--|
| | | |

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(ii) Explain how the grower uses this test to determine when the crop is ready to harvest.

(c) Give reasons why using a test is better than harvesting when the crop "looks ready".

QUESTION THREE: HYDROPONICS

Hydroponics allows the grower to control the level of plant nutrients available to plants, and hence increase crop yield and quality. A typical hydroponic system is shown in the photograph below.



(a) (i) Describe the effect that TWO major nutrients have on growth/productivity.

(ii) Explain how controlling a **balanced** supply of nutrients produces a higher crop yield.

- (b) A hydroponic system is often used by growers of crops such as strawberries, capsicums, and tomatoes. This helps growers to supply produce at different times of the year.
 - (i) Describe how the nutrient levels in a hydroponic system are changed by the grower.

(ii) Explain why the nutrient levels in a hydroponic system are changed during the growing cycle as young plants develop into mature fruiting plants.

(c) Justify the use of hydroponics rather than soil as a growing medium for producing crops that are to be supplied to the market for most of the year.

| | Extra space if required. Write the question number(s) if applicable. | ASSESS USE OF | SOR'S NLY |
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| QUESTION NUMBER | | | |
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