BOSTES BOARD OF STUDIES TEACHING & EDUCATIONAL STANDARDS NSW

2014 HIGHER SCHOOL CERTIFICATE EXAMINATION

Agriculture

General Instructions

- Reading time – 5 minutes
- Working time – 3 hours
- Write using black or blue pen
  Black pen is preferred
- Draw diagrams using pencil
- Board-approved calculators may be used
- Write your Centre Number and Student Number at the top of pages 9, 13, 17, 19 and 21

Total marks – 100

Section I Pages 2–22

80 marks

This section has two parts, Part A and Part B

Part A – 20 marks

- Attempt Questions 1–20
- Allow about 30 minutes for this part

Part B – 60 marks

- Attempt Questions 21–27
- Allow about 1 hour and 45 minutes for this part

Section II Pages 23–24

20 marks

- Attempt ONE question from Questions 28–30
- Allow about 45 minutes for this section

Section I
80 marks

Part A – 20 marks
Attempt Questions 1–20
Allow about 30 minutes for this part

Use the multiple-choice answer sheet for Questions 1–20.

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1 After germination, what is the correct order of the phases of growth for a plant?

(A) Emergence, vegetative, reproductive

(B) Emergence, reproductive, vegetative

(C) Vegetative, reproductive, emergence

(D) Vegetative, emergence, reproductive

2 Which of these management techniques used in crop production is NOT associated with managing competition?

(A) Herbicides

(B) Insecticides

(C) Irrigation

(D) Row spacing

3 Which environmental factor would be most likely to cause seedlings growing in a greenhouse to appear pale and elongated?

(A) Low oxygen level

(B) Low light conditions

(C) Low water availability

(D) Low carbon dioxide level

4 What is meant by the term *flushing* when used with reference to animal production?

(A) Increasing nutrition prior to mating

(B) Allowing an animal's gut to empty before slaughter

(C) Applying backline drenches rather than oral drenches

(D) Wetting animals completely with insecticide to control external parasites

5 A soil test determined that the pH of a soil was 4.

What does this pH level indicate?

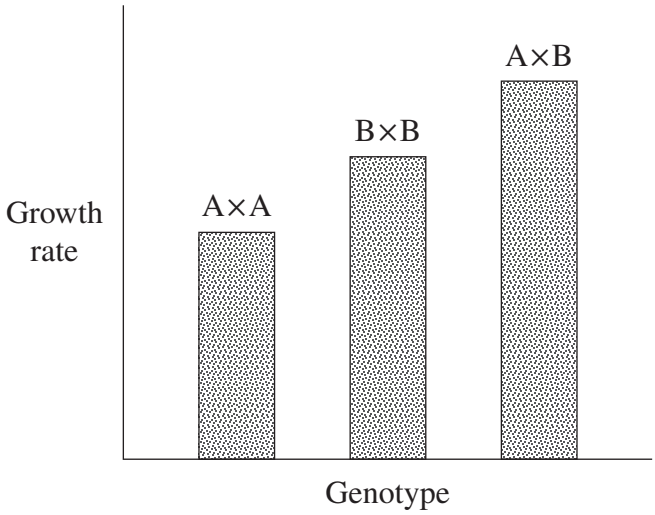
(A) This soil is too saline for seeds to germinate and grow.

(B) This soil is too alkaline (basic) for most plants to grow well.

(C) The most important soil nutrients are available to plants at this pH.

(D) Plants could access a greater range of nutrients if the pH was raised.

6 The graph compares the growth rates for pure bred and cross-bred animals.



What is the cause of the growth rate shown in the cross-bred animals?

(A) Co-dominance

(B) Dominance

(C) Heritability

(D) Hybrid vigour

7 What is most likely to result from the loss of organic matter (soil carbon) from a soil over time?

(A) A change in soil texture

(B) An increase in soil salinity

(C) A breakdown of soil structure

(D) An increase in water-holding capacity

8 Which of the following is the most likely consequence for farm animals under conditions of sustained high temperatures?

(A) Early onset of puberty

(B) Reduced fertility in male animals

(C) Increased birth weights of offspring

(D) Increased ovulation rates in female animals

9 Which of the following is an example of a *value added* product?

(A) Eggs

(B) Raw milk

(C) Diced beef

(D) Wine grapes

10 What is the function of root nodules on legume plants?

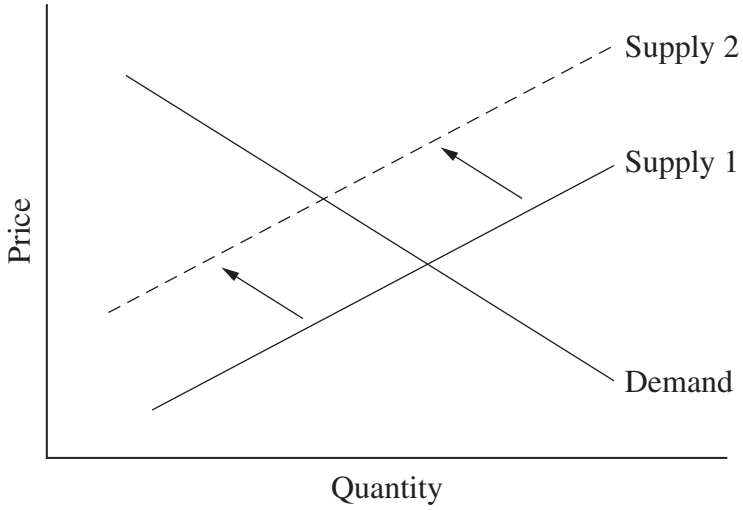
(A) They contain bacteria which assist in the uptake of water.

(B) They store chemicals which stimulate root growth in the plant.

(C) They store proteins which the plant can draw upon in times of stress.

(D) They contain bacteria which convert nitrogen gas into nitrogen-containing compounds.

11 Supply and demand curves for an agricultural product are shown.



What is the outcome of a shift from Supply 1 to Supply 2?

(A) The price for the product would remain unchanged.

(B) There would be a decrease in price for the product.

(C) There would be an increase in price for the product.

(D) Supply, quantity and price would increase for the product.

12 Which of the following best describes an effect that the use of fertilisers can have on water quality?

	Effect on water quality	*Reason*
(A)	Improves	Water becomes more nutrient rich
(B)	Decreases	Fertilisers contribute to algal blooms
(C)	Unchanged	Modern fertilisers are completely absorbed and utilised by plants
(D)	Decreases	Fertilisers directly enter the atmosphere and are converted to acid rain

13 Which statistical measure provides information about the spread of data?

(A) Mean

(B) Median

(C) Mode

(D) Standard deviation

14 How do Australian land capability assessment systems encourage more sustainable farming?

(A) They regulate what farmers can and cannot do on their land.

(B) They enable the financial capability of land to be calculated.

(C) When land is used according to the assessed capability, land degradation issues are reduced.

(D) Farmers can change the capability of their land and ensure their financial sustainability.

15 What name is given to organisms which cause disease?

(A) Hosts

(B) Pathogens

(C) Predators

(D) Vectors

16 Which of the following is a feature of a soil with a high bulk density?

(A) High level of porosity

(B) Low mechanical strength

(C) High levels of organic matter

(D) Closely packed soil particles

17 Which characteristic of a soil would give the best indication of its chemical fertility?

(A) Acidity

(B) Ion exchange capacity

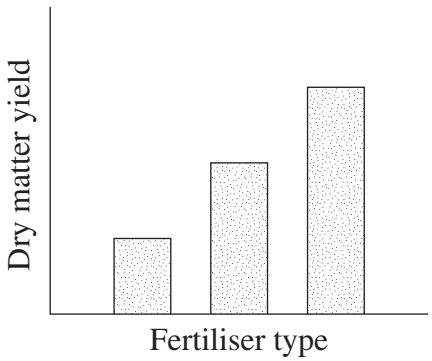
(C) The arrangement of soil particles

(D) The proportions of sand, silt and clay

18 A researcher conducted an experiment in which three different types of fertiliser were applied to a pasture. The dry matter yield was measured.

What is the most suitable graph to represent the data from such a trial?

(A)



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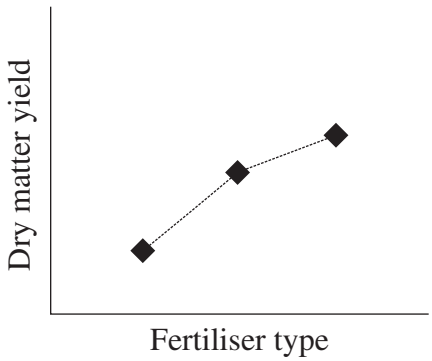
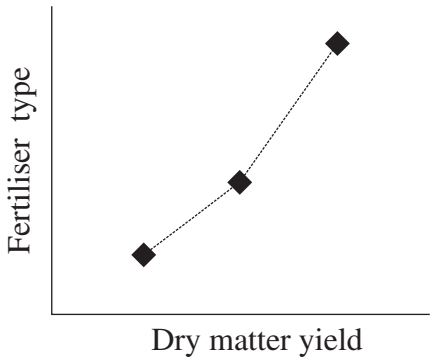
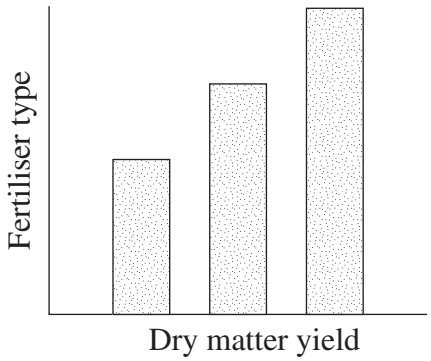


(C)



(D)



19 What is the function of the hormone progesterone in female animals?

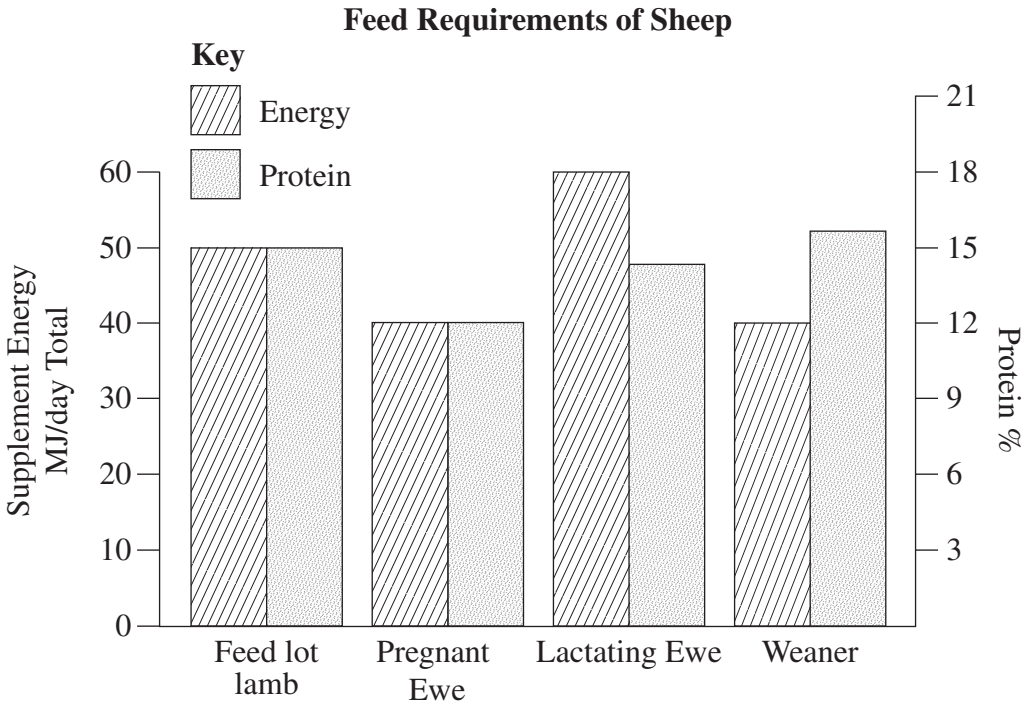
(A) It maintains pregnancy.

(B) It causes milk ‘let down’ following birth.

(C) It causes contraction of the uterus at the time of birth.

(D) It stimulates the development of follicles in the ovary.

20 The graph shows the feed requirements of four types of sheep.



Information about a supplement feed

Supplement Feed			
Protein	15%	Phosphorous	0.5%
Urea	1.2%	Fibre	7%
Calcium	1.0%	Energy MJ/kg	10.5

Consumption of supplement feed

	Sheep Type			
Supplement Feed Consumption kg/day	Feed lot lamb	Pregnant ewe	Lactating ewe	Weaner
	5	4	5	4

Using the information above, for which pair of sheep types is the supplement feed suitable?

(A) Pregnant ewes and weaners

(B) Lactating ewes and weaners

(C) Feed lot lambs and pregnant ewes

(D) Feed lot lambs and lactating ewes

Agriculture

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Section I (continued)

Part B – 60 marks
Attempt Questions 21–27
Allow about 1 hour and 45 minutes for this part

Answer the questions in the spaces provided. These spaces provide guidance for the expected length of response.

Question 21 (8 marks)

Answer parts (a), (b) and (c) in relation to an identified soil degradation problem.

Name of a soil degradation problem .....

(a) Outline an effect of this soil degradation problem on agricultural production. **2**

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(b) Explain how a farming practice can lead to this soil degradation problem. **2**

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Question 21 continues on page 10

Question 21 (continued)

(c) Describe procedures which can be used to alleviate or prevent this soil degradation problem. **4**

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End of Question 21

Question 22 (6 marks)

Answer parts (a) and (b) in relation to an identified plant OR animal pest or disease.

Name of a plant OR animal pest/disease .....

(a) Outline an effect that this plant OR animal pest/disease has on the productivity of an agricultural system. **2**

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(b) Describe the essential components of an integrated pest management program (IPM) for this pest/disease. **4**

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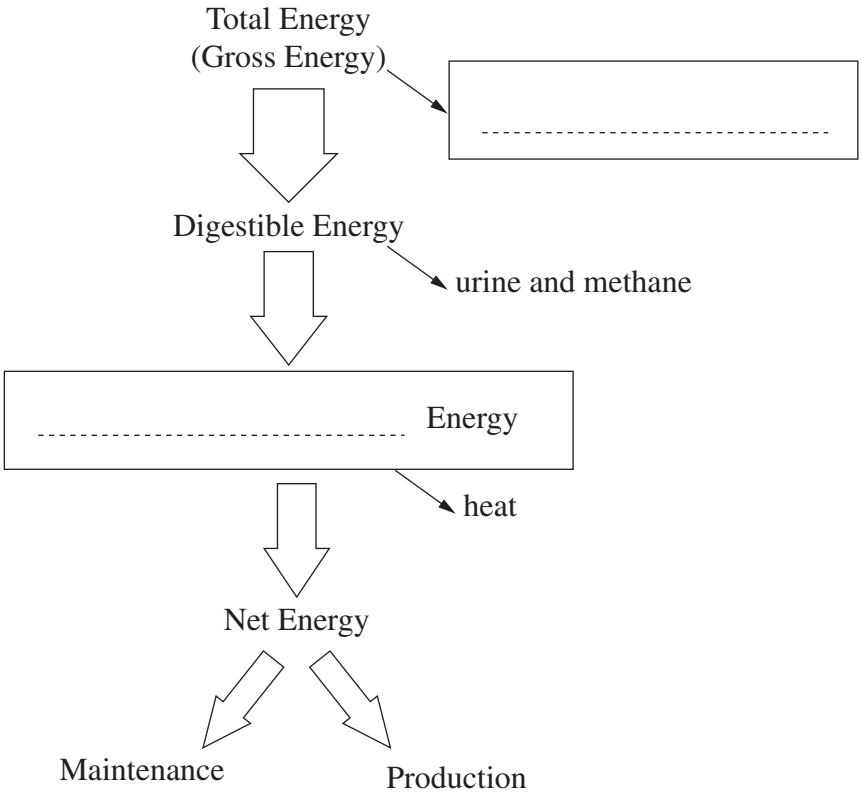
Question 23 (8 marks)

(a) The diagram outlines the fate of energy associated with digestion and metabolism in animals. **2**



Complete the diagram by writing the correct terms into the spaces provided.

Question 23 continues on page 14

Question 23 (continued)

(b) Describe the differences between monogastric animals and ruminant animals in terms of their digestion of protein and carbohydrate. **6**

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End of Question 23

Question 24 (8 marks)

(a) Complete the table to show an effect of each plant hormone. **2**

Plant Hormone	*Effect on the plant*
Ethylene	
Gibberellins	

(b) Explain how management strategies used by farmers can overcome environmental constraints on plant production systems. In your answer, include examples. **6**

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Section I – Part B (continued)

Question 25 (10 marks)

(a) Justify the use of artificial insemination as a technique for manipulating reproduction in farm animals. **5**

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Question 25 continues on page 18

Question 25 (continued)

(b) Explain how objective measurement is used to select breeding stock. In your answer, include a specific example. **5**

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End of Question 25

Centre Number

Student Number

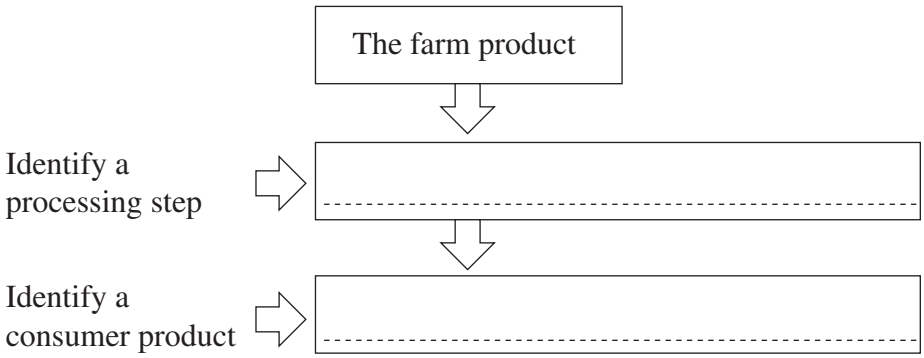
Section I – Part B (continued)

Question 26 (10 marks)

Answer parts (a), (b) and (c) in relation to an identified farm product.

Name of farm product .....

(a) **2**



(b) Explain how the timing of one farm operation can influence the quality or quantity of this farm product. **4**

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Question 26 continues on page 20

(c) Assess the effectiveness of a marketing strategy that is used to promote this product to consumers. **4**

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End of Question 26

Centre Number

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Section I – Part B (continued)

Question 27 (10 marks)

(a) Outline how financial circumstances beyond the control of the farmer can affect farm profitability. **4**

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Question 27 continues on page 22

Question 27 (continued)

(b) Assess the effectiveness of techniques available to analyse the financial performance of farms. **6**

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End of Question 27

Agriculture

Section II

20 marks
Attempt ONE question from Questions 28–30
Allow about 45 minutes for this section

Answer part (a) of the question in a writing booklet.
Answer part (b) of the question in a SEPARATE writing booklet.
Extra writing booklets are available.

In your answers you will be assessed on how well you:

- demonstrate knowledge and understanding relevant to the question
- communicate ideas and information using relevant examples
- present a logical and cohesive response

Question 28 — Agri-food, Fibre and Fuel Technologies (20 marks)

Answer part (a) of the question in a writing booklet.

(a) In this elective you have analysed a research study relating to the development and/or implementation of an agricultural biotechnology.

In your writing booklet, identify this study.

(i) State a conclusion and a recommendation from this research. **2**

(ii) Explain how the design of this research study contributed to the validity of its conclusions. In your answer, include specific examples. **6**

Answer part (b) of the question in a SEPARATE writing booklet.

(b) Describe a current development in agricultural biotechnology, the effect this biotechnology has on agricultural production, and ethical concerns with its use. **12**

OR

Please turn over

In your answers you will be assessed on how well you:

- demonstrate knowledge and understanding relevant to the question
- communicate ideas and information using relevant examples
- present a logical and cohesive response

Question 29 — Climate Challenge (20 marks)

Answer part (a) of the question in a writing booklet.

(a) In this elective you have analysed a research study relating to climate variability or management strategies relating to climate variability.

In your writing booklet, identify this study.

(i) State a conclusion and a recommendation from this research. **2**

(ii) Explain how the design of this research study contributed to the validity of its conclusions. In your answer, include specific examples. **6**

Answer part (b) of the question in a SEPARATE writing booklet.

(b) Assess strategies available to farmers to minimise risk and maximise opportunities in a changing climate. **12**

OR

Question 30 — Farming for the 21st Century (20 marks)

Answer part (a) of the question in a writing booklet.

(a) In this elective you have analysed a research study relating to the development and/or implementation of a recent agricultural technology.

In your writing booklet, identify this study.

(i) State a conclusion and a recommendation from this research. **2**

(ii) Explain how the design of this research contributed to the validity of its conclusions. In your answer, include specific examples. **6**

Answer part (b) of the question in a SEPARATE writing booklet.

(b) Describe a new technological development in agriculture, the effect this technology has on agricultural production, and issues related to its application. **12**

End of paper