

STUDENT NUMBER

CENTRE NUMBER

HIGHER SCHOOL CERTIFICATE EXAMINATION

1999

# AGRICULTURE

2/3 UNIT (COMMON)

## SECTION I

(20 Marks)

*Total time allowed for Sections I, II, III and IV—Three hours  
(Plus 5 minutes reading time)*

### DIRECTIONS TO CANDIDATES

- Write your Student Number and Centre Number at the top right-hand corner of this page.
- Board-approved calculators may be used.

### Section I

- Attempt ALL questions.
- Answer the questions in the spaces provided in this paper.

### MARKER'S USE ONLY

Page	Marks
2	
3	
4	
5	
6	

**SECTION I**

(20 Marks)

Attempt ALL questions.

Allow about 35 minutes for this Section.

MARKER'S  
USE ONLY

**QUESTION 1**

Name ONE farm product you have studied.

Name of farm product .....
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(a) State ONE feature of quality of the product.

.....

(b) Describe how this feature affects the price received for the product by the farmer.

.....

(c) Describe TWO actions a farmer may take to maximise the quality of the product before it leaves the farm.

(i) .....

.....

(ii) .....

.....

(d) Give ONE example of feedback the farmer may receive on the quality of the product.

.....

(e) Farmers do not always make changes to management in response to feedback.

State TWO reasons for this.

(i) .....

(ii) .....

QUESTION 1 (Continued)

MARKER'S  
USE ONLY

- (f) Explain how a factor, other than quality, may affect the price received for the product by the farmer.

.....  
.....

- (g) Explain how off-farm agencies or organisations may contribute to marketing of the product.

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- (h) Outline a possible strategy for value adding to increase returns from the product.

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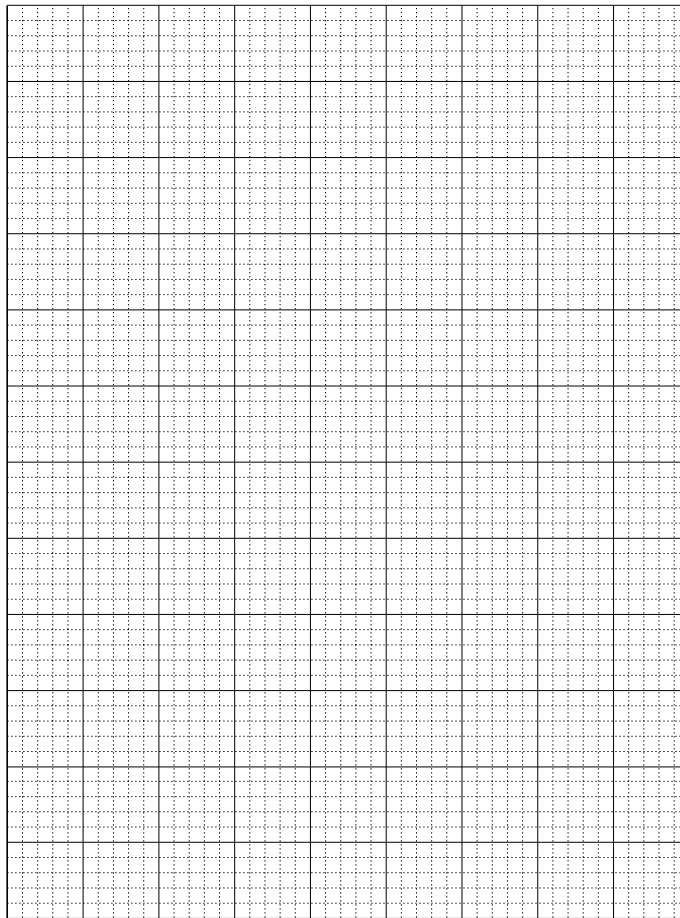
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**QUESTION 2**MARKER'S  
USE ONLYTABLE 1. NUMBER OF PIGGERIES AND BREEDING FEMALES  
IN AUSTRALIA, 1960–1995

<i>Year</i>	<i>Number of piggeries (thousands)</i>	<i>Number of breeding females (thousands)</i>
1960	50	305
1965	40	310
1970	30	320
1975	24	305
1980	20	305
1985	8	315
1990	5	305
1995	3	310

*Australian  
Pork  
Corporation*

- (a) (i) Graph the data from Table 1 on the grid below.



QUESTION 2 (Continued)

MARKER'S  
USE ONLY

(ii) From the graph, estimate the number of piggeries in 1982.

.....

(iii) Describe the trends shown in the data you have plotted.

.....

.....

(iv) Give a possible explanation for the above trends.

.....

.....

(b) (i) Describe TWO factors a farmer may consider before borrowing money.

1 .....

.....

2 .....

.....

(ii) Outline a strategy, other than borrowing money, that a farmer may implement to manage economic sustainability.

.....

.....

**QUESTION 3**MARKER'S  
USE ONLY

A farmer noticed that grazing animals were eating soil from one area (*Area A*) of a paddock, but not from the remainder of the paddock (*Area B*).

Soil samples were taken from each area and sent to a laboratory for analysis.

- (a) Describe the actions the farmer would have taken to ensure that the soil sent to the laboratory provided reliable results.

.....

.....

.....

The laboratory analysis revealed the following results for each area.

TABLE 2. RESULTS OF SOIL ELEMENT ANALYSIS

<i>Soil Element Tested</i>	<i>Amount of Element (mg/kg soil)</i>	
	<i>Area A</i>	<i>Area B</i>
Zinc	53	52
Iron	20 655	15 536
Copper	6	8
Phosphorus	125	124

- (b) From the laboratory results, state which element is most likely to cause the animals to eat the soil.

.....

- (c) On the basis of these results, suggest further investigations that could be undertaken.

.....

.....

.....

- (d) Identify the statistical limitations of the data presented in Table 2.

.....

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STUDENT NUMBER

CENTRE NUMBER

**HIGHER SCHOOL CERTIFICATE EXAMINATION****1999****AGRICULTURE****2/3 UNIT (COMMON)****SECTION II***(20 Marks)*

*Total time allowed for Sections I, II, III and IV—Three hours  
(Plus 5 minutes reading time)*

**DIRECTIONS TO CANDIDATES**

- Write your Student Number and Centre Number at the top right-hand corner of this page.
- Board-approved calculators may be used.

**Section II**

- Attempt THREE questions.
- Answer the questions in the spaces provided in this paper.
- Place a tick in the boxes on this page to indicate the questions you have attempted in Section II.

Question	Questions Attempted	Marker's Use Only
4		
5		
6		
7		

**SECTION II**

(45 Marks)

Attempt THREE questions.

Each question is worth 15 marks.

Allow about 80 minutes for this Section.

MARKER'S  
USE ONLY

**QUESTION 4**

- (a) For an animal production system you have studied, answer the following questions.

Name of animal production system .....
--

- (i) List THREE characteristics a farmer may select for, as part of a genetic improvement program for this animal production system.
  - 1 .....
  - 2 .....
  - 3 .....
- (ii) For a named characteristic listed in part (a) (i) above, explain why this characteristic is considered desirable.

Named characteristic .....
----------------------------

.....

.....

.....

- (iii) Suggest reasons why the farmer is not always successful in breeding animals with the desired characteristics.
  - .....
  - .....
  - .....
  - .....

QUESTION 4 (Continued)

MARKER'S  
USE ONLY

- (b) Explain how farmers can use objective measurement and associated data in animal production systems.

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(c)

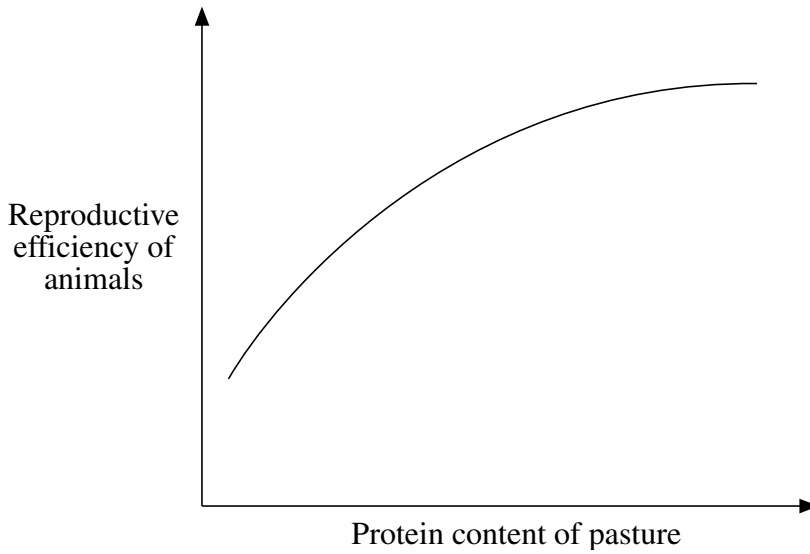


FIG. 1. EFFECT OF PROTEIN CONTENT OF PASTURES ON REPRODUCTIVE EFFICIENCY OF ANIMALS

- (i) From the information presented in Figure 1, describe the relationship between protein content of pastures and reproductive efficiency.

.....

.....

- (ii) Outline TWO management practices a farmer may use to optimise the protein content of pastures.

1 .....

.....

2 .....

.....

QUESTION 4 (Continued)

MARKER'S  
USE ONLY

(iii) Describe TWO management techniques a farmer may use to optimise intake of available pasture protein.

1 .....

.....

2 .....

.....

(iv) Describe how the reproductive efficiency of animal production systems may be determined.

.....

.....

.....

(v) List THREE factors, other than nutrition, that may affect the reproductive efficiency of animal production systems.

1 .....

2 .....

3 .....

**QUESTION 5**

MARKER'S  
USE ONLY

- (a) Figure 2 illustrates the effect of the numbers of harmful soil organisms in a paddock on the yield of a crop over five years. Note that no crop was grown in Year 3 (fallowing).

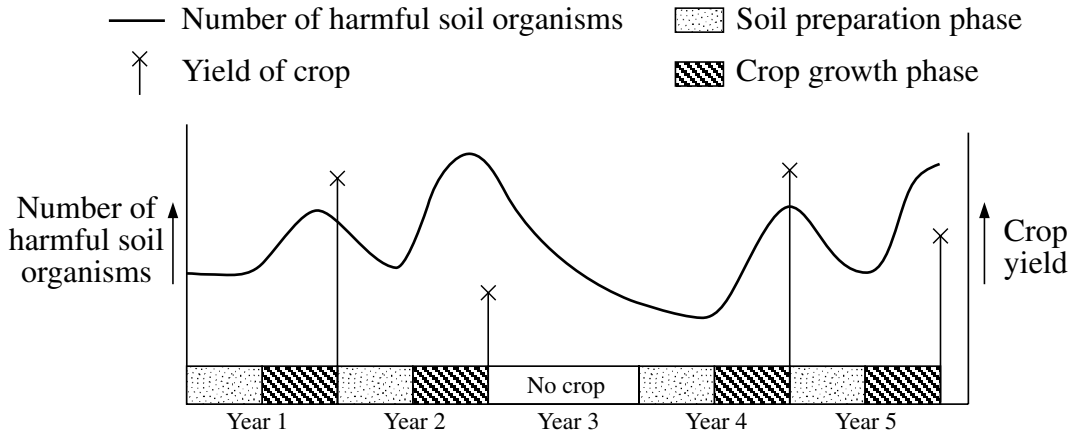


FIG. 2. RELATIONSHIP BETWEEN HARMFUL SOIL ORGANISMS AND CROP YIELD

- (i) From the data presented in Figure 2, give a reason why crop yield has decreased in Year 2 and Year 5.

.....

- (ii) Give reasons for the trend in the number of harmful organisms in Figure 2.

.....  
.....  
.....  
.....

- (iii) Name a management strategy, other than fallowing or using chemicals, and describe how this strategy may reduce the number of harmful soil organisms.

Name of strategy .....  
.....  
.....

QUESTION 5 (Continued)

MARKER'S  
USE ONLY

(iv) Name a soil organism that may benefit plant production.

.....

(v) Explain how this named organism can improve plant production.

.....

.....

.....

.....

(b) For a plant production system you have studied, answer the following questions.

Name of plant production system .....
---------------------------------------

(i) Describe TWO reasons why the farmer has chosen this plant production system.

1 .....

.....

2 .....

.....

(ii) Name a pest or disease of the named plant production system.

.....

(iii) Describe how this pest or disease affects the productivity of the plant production system.

.....

.....

.....

QUESTION 5 (Continued)

MARKER'S  
USE ONLY

(iv) State THREE factors a farmer may consider before deciding to use a chemical agent to control pests or diseases.

1 .....

2 .....

3 .....

(v) For one of the factors mentioned in part (iv) above, explain why this factor must be considered.

Name of factor .....
----------------------

.....  
.....  
.....

(vi) Describe how a factor outside the farmer's control may affect the impact of pests or diseases.

.....  
.....  
.....





QUESTION 6 (Continued)

MARKER'S  
USE ONLY

(iii) It is not always desirable for a farmer to grow the crop that would provide the most profit in the short term. Describe why a farmer may decide to plant the less profitable crop.

.....  
.....  
.....

(iv) State TWO factors that can affect the price received (\$/tonne) for a crop.

1 .....  
2 .....

(v) List THREE factors other than price that a farmer may consider before deciding to introduce a new crop.

1 .....  
2 .....  
3 .....

(b) Some farming activities have harmful effects on the farm and beyond the farm boundary.

(i) State ONE such activity and describe its harmful effects.

Activity .....  
Effects .....  
.....  
.....

(ii) Describe actions a farmer may take to minimise the possible harmful effects.

.....  
.....  
.....

(iii) Describe how a farmer may evaluate the effectiveness of one of the actions you have listed in part (ii).

.....  
.....

QUESTION 6 (Continued)

MARKER'S  
USE ONLY

- (c) Table 4 illustrates the effect of a summer rain storm on five experimental plots of cropping land.

TABLE 4. EFFECT OF RAINFALL RUN-OFF ON SOIL LOSS

<i>Treatment plot</i>	<i>Run-off</i> (% of storm rain)	<i>Soil loss</i> (tonnes/hectare)
Stubble burnt	83	100
Stubble incorporated	41	5
Stubble mulched	45	2
Summer crop	16	2
Zero tillage	2.0	negligible

- (i) Suggest a reason for the high soil loss in the ‘stubble burnt’ treatment.  
.....  
.....
- (ii) Explain why farmers may choose to burn stubble.  
.....  
.....  
.....
- (iii) State THREE factors, other than those listed in Table 4, that can affect the level of soil erosion.  
1 .....  
2 .....  
3 .....

**QUESTION 7**

MARKER'S  
USE ONLY

(a) Figure 3 represents data from a dairy farm in the coastal district of NSW and shows:

- the typical production patterns for a permanent grass/legume pasture and an annual grazing crop; and
- the feed requirement for the milking herd with a stocking rate of TWO cows per hectare.

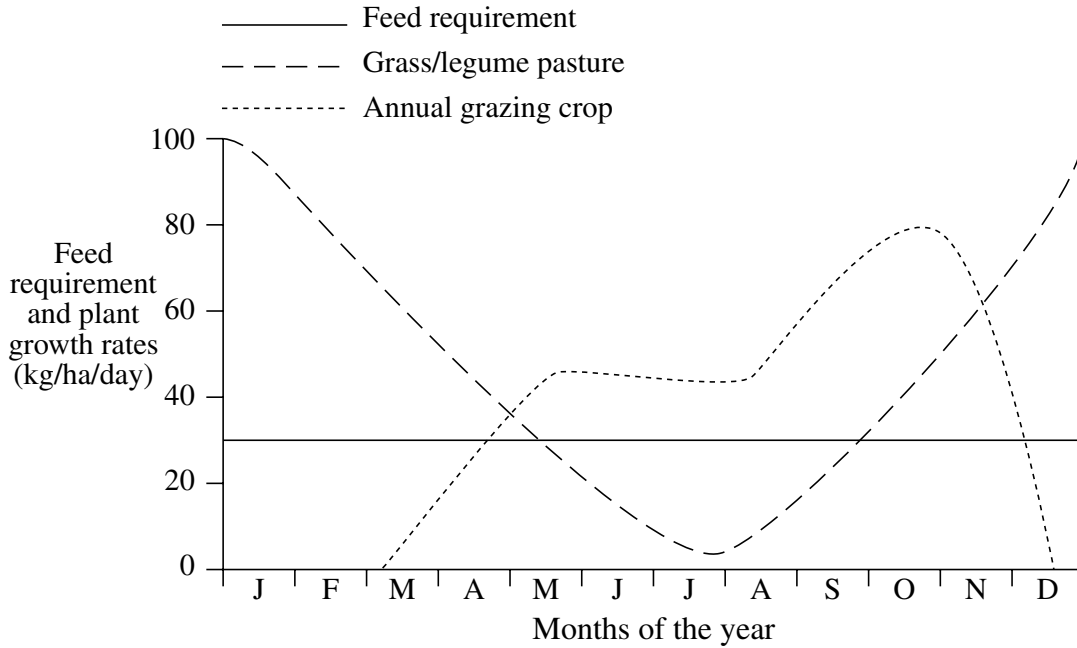


FIG. 3. PLANT GROWTH RATE AND ANIMAL FEED REQUIREMENT  
 Lovett, J V & Scott, J M, *Pasture Production and Management*, Inkata Press, Port Melbourne, 1997

(i) From Figure 3, calculate the feed requirement of one cow per day.

.....

(ii) State the main reason for including the annual grazing crop in the farm's feed production program.

.....  
.....

(iii) Outline a reason for the reduced plant growth rate between May and July.

.....  
.....

**Question 7 continues on page 20**

QUESTION 7 (Continued)

MARKER'S  
USE ONLY

- (iv) Grass/legume combinations are important in productive sustainable pastures. Suggest TWO roles played by each type of plant.

Grass

1 .....

2 .....

Legume

1 .....

2 .....

- (b) Figure 4 shows the life cycle of the cattle tick. This tick is an external parasite of cattle.

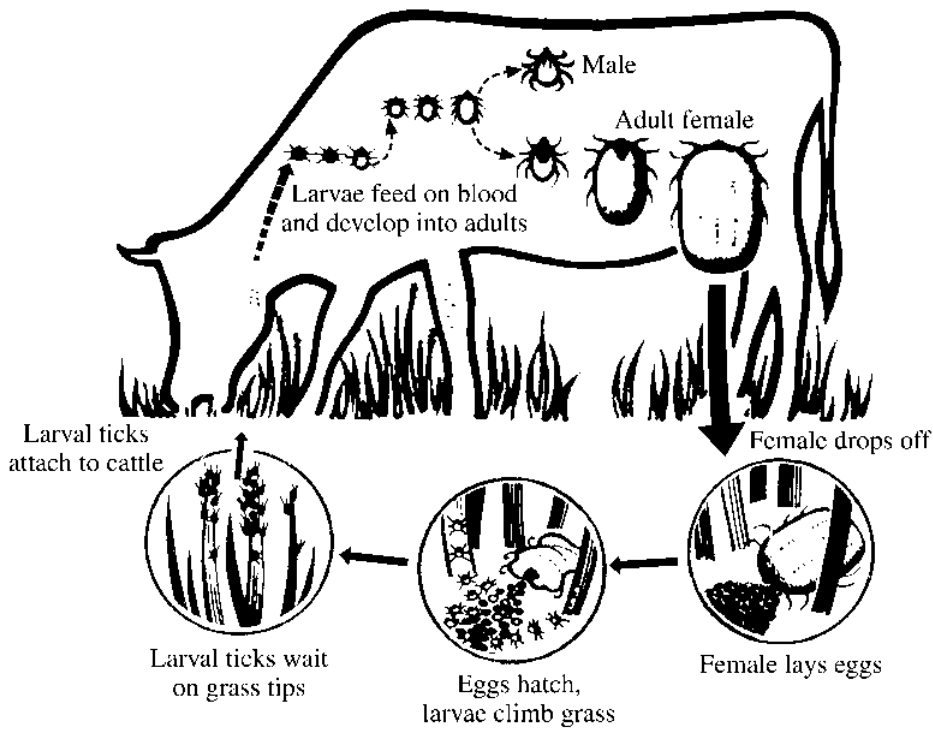


FIG. 4. THE LIFE CYCLE OF THE CATTLE TICK

*Wilson, D & Bauer, M, Dynamic Science, McGraw Hill, Roseville, 1991*

- (i) Describe the role of the host animal in the life cycle of the cattle tick.

.....

.....

.....

QUESTION 7 (Continued)

MARKER'S  
USE ONLY

(ii) Describe the role of the pasture in the life cycle of the cattle tick.

.....  
.....

(iii) State TWO factors that could increase the number of larval ticks. Give reasons for your answer.

1 .....  
.....

2 .....  
.....

(iv) The farmer could use integrated pest management (IPM) techniques to reduce the number of parasites on this host animal.

For a named pest or disease organism of an animal you have studied, describe a suitable IPM strategy.

Animal you have studied .....
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Pest or disease .....

Strategy .....

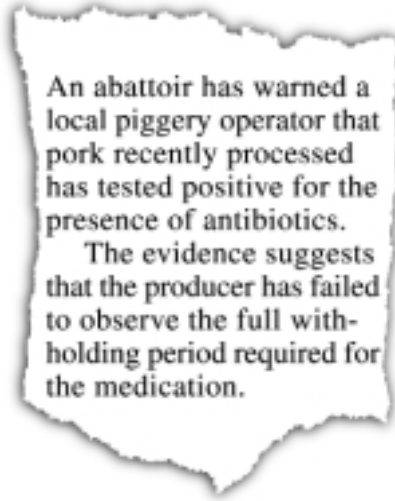
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**Question 7 continues on page 22**

QUESTION 7 (Continued)

MARKER'S  
USE ONLY

- (c) Read the following extract from a newspaper article and answer the questions that follow.



- (i) State reasons for the use of antibiotics in intensive animal production systems such as piggeries.

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- (ii) Describe what is meant by *withholding period*.

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.....

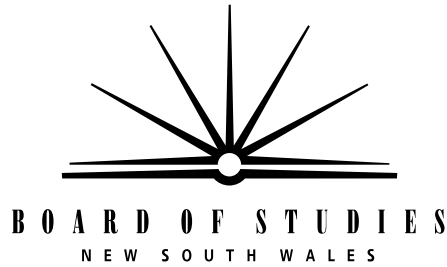
- (iii) State TWO animal welfare issues that must be considered by the farmer in intensive animal production systems.

1 .....  
2 .....

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HIGHER SCHOOL CERTIFICATE EXAMINATION

1999

**AGRICULTURE**

2/3 UNIT (COMMON)

**SECTION III***(20 Marks)***SECTION IV***(15 Marks)*

*Total time allowed for Sections I, II, III and IV—Three hours  
(Plus 5 minutes reading time)*

**DIRECTIONS TO CANDIDATES**

- Write your Student Number and Centre Number at the top right-hand corner of this page.
- Board-approved calculators may be used.

**Section III**

- Attempt ONE question.
- Answer the question in the spaces provided in this paper.
- Place a tick in the box on this page to indicate the question you have attempted in Section III.

**Section IV**

- Attempt ONE question.
- Answer the question in a SEPARATE Writing Booklet.
- You may ask for additional Writing Booklets if you need them.

Question	Question Attempted	Marker's Use Only
8		
9		
10		

**SECTION III**

(20 Marks)

Attempt ONE question.

Each question is worth 20 marks.

Allow about 35 minutes for this Section.

MARKER'S  
USE ONLY

**QUESTION 8 Plant Production**

(a) Using examples, describe techniques or strategies that lead to improved plant production through the manipulation of:

(i) soil moisture;

.....  
.....  
.....  
.....

(ii) mineral nutrients.

.....  
.....  
.....  
.....

QUESTION 8 (Continued)

MARKER'S  
USE ONLY

(b)

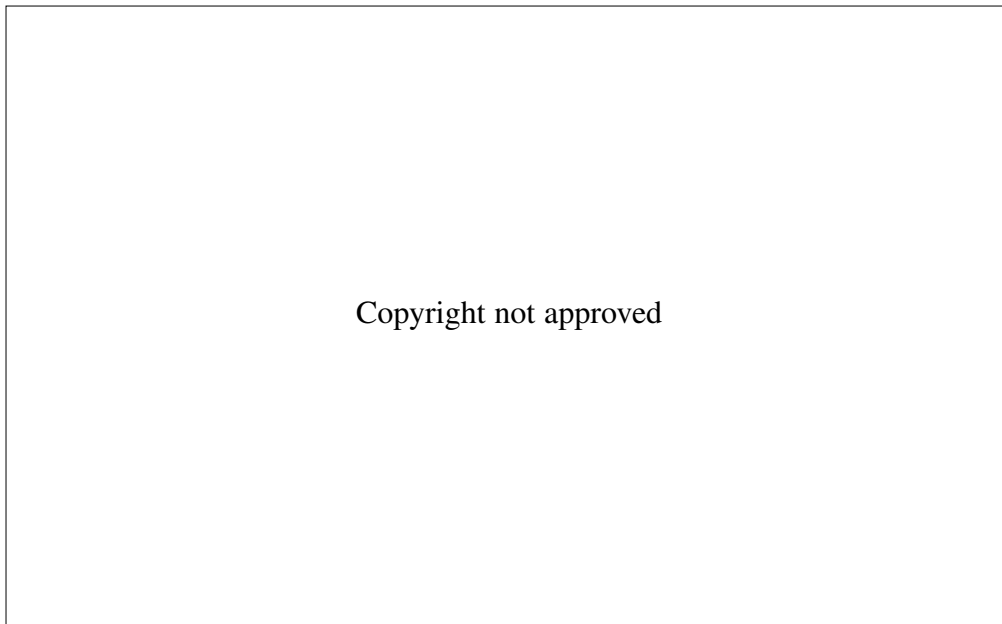


FIG. 5. SIMPLE PLANT DIAGRAM

Using the above figure, complete the table below.

<i>Part</i>	<i>Plant part</i>	<i>Function</i>
<b><i>a</i></b>		
<b><i>b</i></b>		
<b><i>c</i></b>		

(c) Using examples, outline the benefits to plant production systems of:

(i) hybridisation;

.....  
.....  
.....

(ii) tissue culture.

.....  
.....  
.....

**Question 8 continues on page 28**



**QUESTION 9 Animal Production**

MARKER'S  
USE ONLY

- (a) The growth curves for two genetically identical animals are shown in Figure 6 below.

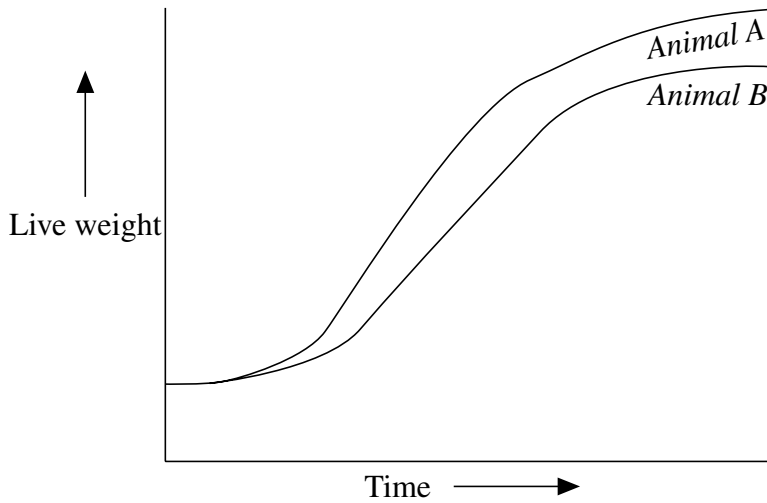


FIG. 6. GROWTH CURVES

- (i) Explain how the use of manufactured chemicals or hormones may affect growth and development.

.....  
.....  
.....  
.....

- (ii) State TWO possible reasons, other than the use of manufactured chemicals and hormones, why *Animal A* has outperformed *Animal B* in terms of live-weight gain.

1 .....  
2 .....

- (iii) Describe ONE situation in which *Animal B* may be preferred to *Animal A*.

.....  
.....

**Question 9 continues on page 30**

QUESTION 9 (Continued)

MARKER'S  
USE ONLY

(b) (i) Define the terms *antigen* and *antibody*.

.....  
.....  
.....  
.....

(ii) Explain how a vaccine can be used to develop long-term immunity to disease.

.....  
.....  
.....  
.....

(c) For a named disease of an animal production system you have studied, answer the following questions.

Animal production system .....
Name of disease .....

Explain possible disadvantages of ONE management practice used to control this disease.

.....  
.....  
.....  
.....



**QUESTION 10 Land Management**

MARKER'S  
USE ONLY

(a) (i) Describe TWO ways trees are beneficial on farms.

- 1 .....
- .....
- 2 .....
- .....

(ii) Suggest why tree-planting programs are not always implemented on farms.

.....  
.....

(b) Explain how agricultural activities may increase the rate of soil acidification.

.....  
.....  
.....  
.....

(c) Describe ways in which a farmer may become aware of a specific soil degradation problem on the farm.

.....  
.....  
.....  
.....

(d) Describe the causes of:

(i) dry-land salinity;

.....  
.....  
.....

(ii) irrigation salinity.

.....  
.....  
.....



QUESTION 10 (Continued)

MARKER'S  
USE ONLY

- (e) • Outline the activities used by Total Catchment Management and Landcare programs to improve the sustainable use of land and water.
- Describe the effectiveness of these activities.

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**Please turn over**

**SECTION IV****Marks**

(15 Marks)

Attempt ONE question.

Each question is worth 15 marks.

Allow about 30 minutes for this Section.

**QUESTION 11**

For an agricultural product you have studied:

- (a) describe the effect of the shift from supply-orientated production to demand-driven production; **6**
- (b) assess the role of each of the major components in the marketing chain. **9**

**QUESTION 12**

A successful farmer must plan management practices to overcome limiting factors in plant production systems.

- (a) Outline some of the limiting factors involved in the growth and development of plants. **5**
- (b) For a plant production system you have studied, describe management practices used to overcome limiting factors. **7**
- (c) In what ways is the farmer able to assess the effectiveness of these management practices. **3**

**QUESTION 13****Marks**

Modern animal production systems require the management of both genetic and environmental factors.

Using examples from animal production systems:

- (a) describe how genetic factors are managed to optimise production; **5**
- (b) describe how environmental factors are managed to optimise production; **5**
- (c) outline how an area of scientific research, other than in the field of genetics, has improved the productivity of animals. **5**

**QUESTION 14**

‘Manage the microbes to maximise money.’

- (a) Describe, using examples, how micro-organisms benefit agricultural systems. **8**
- (b) Describe, using examples, how micro-organisms have negative effects on agricultural systems. **7**

**End of paper**

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