



BOARD OF STUDIES
NEW SOUTH WALES

HIGHER SCHOOL CERTIFICATE EXAMINATION

1998

AGRICULTURE

3 UNIT (ADDITIONAL)

(32 Marks)

*Time allowed—One hour and a quarter
(Plus 5 minutes reading time)*

DIRECTIONS TO CANDIDATES

- Answer each question in a SEPARATE Writing Booklet.
- You may ask for additional Writing Booklets if you need them.
- Board-approved calculators may be used.

Section I (8 marks)

- The question in this Section is COMPULSORY.

Section II (24 marks)

- Attempt TWO questions.
- All questions are of equal value.

SECTION I**Marks**

(8 Marks)

The question in this Section is **COMPULSORY**.

Answer the question in a **SEPARATE** Writing Booklet.

QUESTION 1

Modern agricultural research has focused on improving farm productivity to maintain farm profitability. For an area of research that you have studied:

- (a) describe the effects of the findings of the research on farm profitability; **4**
- (b) discuss the issues relevant to the research that must be considered by the researcher. **4**

SECTION II**Marks**

(24 Marks)

Attempt TWO questions.

Each question is worth 12 marks.

Answer each question in a SEPARATE Writing Booklet.

QUESTION 2. Animal Breeding and Reproduction

EITHER

- (a) The reproduction of farm animals relies on effective operation of the endocrine (hormone) system of the body.
- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| (i) Name and describe the roles of FOUR hormones that are primarily involved in the reproduction of farm animals. | 6 |
| (ii) Describe, using an example, how the action of ONE reproductive hormone can affect the production and action of another reproductive hormone. | 3 |
| (iii) Describe ONE management technique that can be used to influence the normal/natural functions of reproductive hormones, and hence improve breeding efficiency of animal production systems. | 3 |

OR

- (b) From their simple beginnings, systems such as Breedplan and Lambplan, have expanded and now analyse more heritable characteristics.
- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| (i) Explain, using examples of heritable characteristics, why an understanding of heritability is important to animal breeders. | 3 |
| (ii) Describe the types of management practices and any special equipment that may be required to collect the raw data for systems such as Breedplan and Lambplan. | 4 |
| (iii) Assess the potential benefits to animal production that result from using the processed data, such as estimated breeding values (EBVs) and animal breeding values (ABVs). | 5 |

QUESTION 3. Horticulture**Marks**

EITHER

- (a) Horticulturalists can modify the environment in which plants grow.
- (i) Outline THREE environmental modifications that are used by horticulturalists. **3**
 - (ii) Using examples, explain how these environmental modifications affect the plants. **4**
 - (iii) Critically analyse the role of these modifications on the economic viability and environmental sustainability of horticultural systems. **5**

OR

- (b) To remain competitive in today's markets, many producers are introducing technological change and/or innovation into their production and post-harvest handling techniques.

For both domestic and international markets, discuss how the following have changed to meet market requirements:

- (i) types of products; **4**
- (ii) production techniques; **4**
- (iii) post-harvest handling processes. **4**

QUESTION 4. Alternative Agricultural Systems

EITHER

- (a) Alternative agricultural systems must implement strategies/plans that lead to their long-term economic and environmental sustainability. Using examples from an alternative agricultural system that you have studied:
- (i) discuss strategies/plans that are implemented by managers to ensure the long-term economic and environmental sustainability of the system; **8**
 - (ii) evaluate the role of institutional and/or legal requirements in the establishment of alternative agricultural systems. **4**

OR

- (b) A researcher was asked to explore the viability of an alternative production system in which free-range layer hens are raised on pastures.
- (i) In making an assessment of the viability of such an alternative production system, describe the kinds of economic, environmental and management factors that the researcher would need to consider. **6**
 - (ii) For an alternative system you have studied, show how these same factors have been evaluated to determine the viability of this production system. **6**

QUESTION 5. Technological Perspectives in Agriculture**Marks**

EITHER

- (a) In recent years more farm managers are using computers to assist them in the management of their farms.
- (i) Outline the diversity of computer applications available for a farm manager to use in Australia. **3**
 - (ii) Describe the kinds of data a producer would collect and use as input in a computer management system. **4**
 - (iii) Explain how a farm manager could use computer-generated information to assist in decision making. **5**

OR

- (b) Change characterises modern agriculture. For a plant OR an animal production system that you have studied:
- (i) describe how changes in technology have influenced management practices and product marketing; **6**
 - (ii) evaluate the impact of these technological changes on management and marketing at both the farm and post-farm levels. **6**

QUESTION 6. Pasture Production

EITHER

- (a) Climate, soil fertility, farm enterprises, and the farmer's management, determine the plant species used to establish a pasture. Using examples of grazing management systems you have studied:
- (i) describe how the establishment and management of pastures relate to soil fertility, climate and farm enterprise; **8**
 - (ii) compare TWO alternative grazing systems in terms of their ability to optimise animal productivity. **4**

OR

- (b) The quantity and quality of available feed varies considerably throughout the year. For grazing management systems you have studied:
- (i) describe management strategies that are used to cope with varying quantity and quality of feed; **8**
 - (ii) assess the success or otherwise of these management strategies in providing year-round pasture-based feed for grazing animals. **4**

QUESTION 7. Coping with Climate**Marks**

EITHER

- (a) Of all the environmental factors, rainfall is the most significant in Australian agriculture.
- (i) Discuss this statement in relation to the distribution of the major agricultural systems in Australia. **4**
 - (ii) Describe strategies that have been used to cope with water requirements in Australian agriculture in the short term on the farm, and in the longer term on the farm and over whole catchments. **8**

OR

- (b) The study of climate requires continuous collection of daily observations that creates a database to help predict likely weather patterns in the short term and long term.
- (i) List the components of climate that are measured daily, and briefly describe the methods used to measure them. **3**
 - (ii) Describe how these data can be used by the farm manager in scheduling agricultural practices in the short term. **4**
 - (iii) Explain the strategies a farmer can put in place to help take into account the extremes of climate that occur on a longer-term basis. **5**

QUESTION 8. Agribusiness**Marks**

EITHER

- (a) Farm managers must understand all areas of financial analysis and be able to link this to marketing and selling information in order to remain a viable small business.
- (i) Describe the financial techniques used to analyse farm finances. **3**
 - (ii) Evaluate the strengths and weaknesses of alternative selling systems that farm businesses could explore. **4**
 - (iii) Explain how decisions about selling systems, time of selling and value adding, can influence the financial situation of a farm. **5**

OR

- (b) The economic health of our trading partners, particularly in Asia, has the potential to affect agricultural industries because of the high dependence on export markets. Using specific examples:
- (i) describe the selling systems and marketing strategies that focus on international markets; **6**
 - (ii) assess the effect that fluctuations in international markets have on farm enterprise decision making. **6**

Please turn over

QUESTION 9. Whole-farm Planning**Marks**

EITHER

- (a) Within a whole-farm plan, farmers can maximise the benefits of trees and integrate them with the rest of the farm's resources and enterprises. In relation to this statement:
- (i) list the benefits of trees to a whole-farm plan; **3**
 - (ii) explain the factors that affect the location of trees in a whole-farm plan; **5**
 - (iii) explain how tree management and enterprise management must be carefully planned to optimise farm productivity. **4**

OR

- (b) The tension between short-term financial needs and long-term sustainable practices is reflected in issues associated with whole-farm planning. To illustrate this tension:
- (i) explain the role of financial planning, budgeting and rate of implementation on decisions about implementing a whole-farm plan; **6**
 - (ii) evaluate the role of off-farm agencies in promoting the benefits and strategies of whole-farm planning. **6**

End of paper