education

Department:
Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION - 2006

AGRICULTURAL SCIENCE PAPER 2

HIGHER GRADE

OCTOBER/NOVEMBER 2006

802-1/2E

MARKS: 200

TIME: 2 hours

802 1 2E HG

X05

This question paper consists of 13 pages.

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. This question paper consists of TWO sections: SECTION A and SECTION B.
3. Answer ALL the questions in the agricultural science context in the ANSWER BOOK provided.
4. Number the answers exactly as the questions are numbered.
5. Start each question on a NEW page.
6. Read the questions carefully and answer what is asked.
7. Non-programmable calculators may be used.
8. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various possible options are provided as answers for the following questions. Write only the letter (A - D) next to the question number (1.1.1 – 1.1.10) in the answer book, for example 1.1.11 D.

1.1.1 The alimentary canal of the fowl does not have a/an ...

A duodenum.
B colon.
C caecum.
D ileum. (2)

1.1.2 The liver and the pancreas secrete bile and pancreatic juices respectively. Into which part of the alimentary canal do these secretions pass?

A Caecum
B Duodenum
C Colon
D Ileum (2)

1.1.3 To prevent pollution, it is important that the pesticides used for agricultural purposes must ...

A not be biodegradable.
B be biodegradable.
C disrupt the food chain.
D not disrupt the food chain. (2)

1.1.4 In young ruminants the ... of the stomach are poorly developed.

A rumen, reticulum and omasum
B rumen, omasum and abomasum
C rumen and reticulum
D reticulum and abomasum (2)

1.1.5 Market equilibrium refers to a situation where ...

A the salaries or wages of consumers are exactly equal to the prices of products they require.
B the product price is reduced because of low demand.
C the demand for a product is equal to its supply at the market.
D the product price is high because of high product demand. (2)

1.1.6 The situation where too little capital is available for farming purposes and the production factors are not fully utilised:

A High demand for agricultural loans
B Low demand for agricultural loans
C Overcapitalisation
D Undercapitalisation (2)

1.1.7 The endocrine glands which secrete testosterone are known as ...

A Corpus luteum.
B Cowper's glands.
C Leydig's cells.
D Sertoli cells. (2)

1.1.8 Successful artificial insemination depends on the time at which the insemination is done. The best results are achieved by inseminating during ...

A the first half of oestrus.
B met-oestrus.
C pro-oestrus.
D the second half of oestrus. (2)

1.1.9 The most appropriate irrigation system for orchards on sandy soils is ...

A spray irrigation.
B drip irrigation.
C furrow irrigation.
D bed irrigation. (2)

1.1.10 Toxic ions in irrigation water include a ...

A high concentration of nitrogen.
B high concentration of calcium.
C high concentration of biological matter.
D high concentration of boron. (2)

1.2 Give ONE word/term for each of the following descriptions:

1.2.1 The type of cell division which takes place just after fertilisation (2)

1.2.2 The description of demand for agricultural products where there is little reaction to price changes (2)

1.2.3 The fixed ratio between surface evaporation and evapo-transpiration that is taken into account in scheduling of irrigation (2)

1.2.4 The vitamin that influences the normal absorption of calcium and phosphorus in the body of an animal (2)

1.2.5 The food component that is responsible for the bulkiness of the food a ruminant eats (2)

1.3 Change the underlined word(s) in each of the following statements. Write only the correct word(s) next to the question number (1.3.1 – 1.3.5) in the answer book.

1.3.1 In the fowl lips and teeth are absent. However, their function is taken over by the pharynx. (2)

1.3.2 Peristalsis in the opposite direction may also occur as in the case of vomiting and is known as relaxation. (2)

1.3.3 During oestrus the vagina of the cow swells. (2)

1.3.4 Mechanical methods (machinery) is sometimes used to replace animal and human labour and this is known as capital. (2)

1.3.5 Carrying capacity is where no grazing is applied and all the forage is cut and fed to animals. (2)

1.4 Choose an item/word(s) from COLUMN B that matches a/an item/word(s) in COLUMN A. Write only the letter (A – J) next to the question number (1.4.1 – 1.4.5) in the answer book, for example 1.4.6 K.

COLUMN A		COLUMN B	
1.4.1	Epididymis	A	milk
1.4.2	Lutenising hormone (LTH)	B	growth stimulant
1.4.3	Blood clotting	C	drip irrigation
1.4.4	Dropper nozzle	D	abnormal spermatozoon
1.4.5	Perishability	E	maturation of spermato-zoa
		F	sprinkler irrigation
		G	vitamin K
		H	secondary characteristics
		I	parturition
		J	vitamin A (5 x 2)

(10)

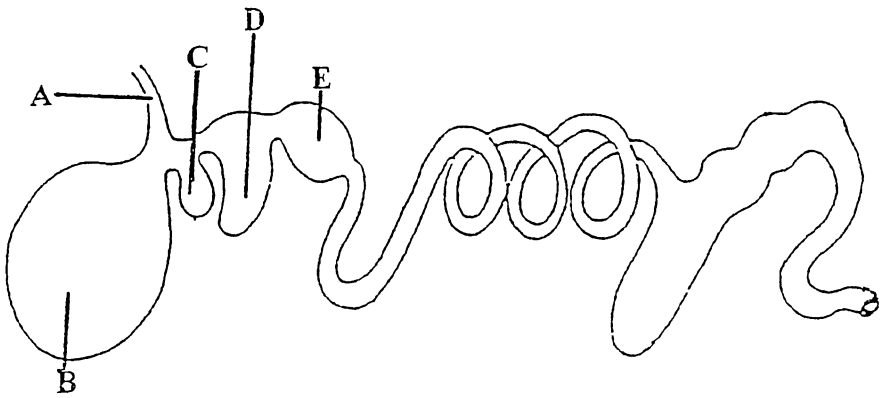
TOTAL SECTION A: 50

SECTION B

QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

2.1 Study the diagram of the digestive system below and then answer the questions that follow:



2.1.1 Identify the type of animal represented by the diagram. (1)

2.1.2 Identify TWO differences between the digestive systems of a cow (cattle) and a chicken (fowl). (4)

2.1.3 Label parts A to E on the diagram of the digestive system. (5)

2.1.4 Briefly explain the process of cellulose digestion in the rumen of the ruminant. (6)

2.1.5 Describe how the small intestine is adapted to allow for the absorption of digested food. (4)

2.2 Give TWO reasons why each of the following results was obtained in a feeding programme for dairy cows. The dairy cows received the same amount of a production ration each day.

2.2.1 On very hot days cows produced less milk than on normal warm days. (4)

2.2.2 On cold days cows produced less milk than on normal warm days. (4)

2.3 Digestibility of feeds:

2.3.1 A sample of animal feed contains 78% of total digestible nutrients (TDN) and 9% of digestible protein (DP). Calculate the nutritive ratio (NR) of this feed. Show ALL calculations. (3)

2.3.2 State TWO application possibilities for the feed referred to in QUESTION 2.3.1 and give a reason. (3)

2.4 Indicate the type of mineral deficiency and the animal type that can be treated or supplemented by the following methods indicated in the table below:

	Method	Mineral deficiency	Type of animal
2.4.1	Injection for milk fever		
2.4.2	Soil sods (red loam soil)		
2.4.3	Dosing with cobalt bombs		

(6)
[40]

QUESTION 3: ANIMAL REPRODUCTION

Start this question on a NEW page.

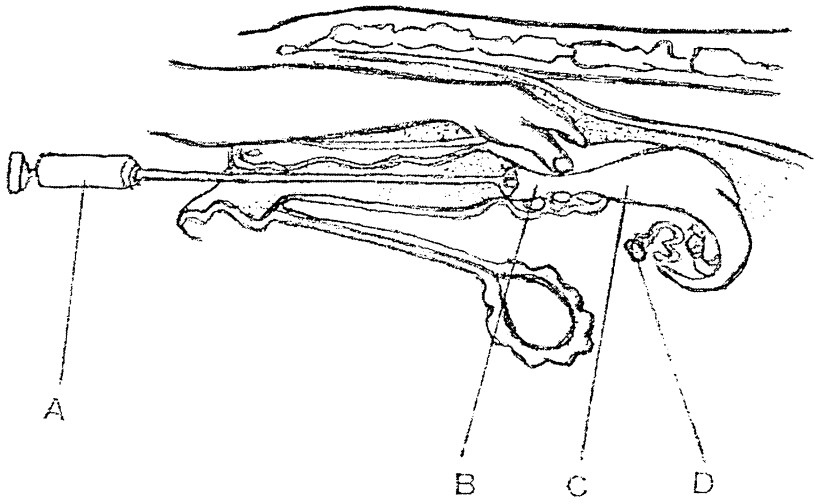
3.1 A beef farmer experiences a decline in the calving percentage (number of calves per 100 cows being born per year) over the last two years.

3.1.1 The farmer has identified FOUR reasons for the decline in the calving percentage. Explain how the four reasons listed below have resulted in the decline in the calving percentage:

(a) Malnutrition (2)
(b) Management (2)
(c) Lack of libido in bulls (2)
(d) Diseases (2)

3.1.2 Formulate FOUR possible solutions for the reasons discussed in QUESTION 3.1.1 that the farmer can implement to improve the situation in the herd. (4)

3.2 Study the following diagram and answer the questions that follow:



3.2.1 Name the technique (method) illustrated in the above diagram. (1)

3.2.2 Name the parts labelled A to D. (4)

3.2.3 Indicate the letter of the part on the diagram of the reproductive system where the semen is deposited. (1)

3.2.4 Describe FOUR functions of semen dilutants to ensure the successful storage of semen. (4)

3.3 Explain the importance of the following hormones in the process of parturition and milk production:

3.3.1 Oxytocin (2)

3.3.2 Follicle stimulating hormone (FSH) (2)

3.3.3 Adrenalin (2)

3.3.4 Prolactin (2)

3.4 Answer the following questions on breeding methods:

3.4.1 Differentiate between the methods of crossbreeding and upgrading of animals. (4)

3.4.2 You are the manager or owner of a commercial beef herd. What type of breeding method would you prefer, crossbreeding or inbreeding? Give FIVE reasons for your choice of breeding method. (6)

[40]

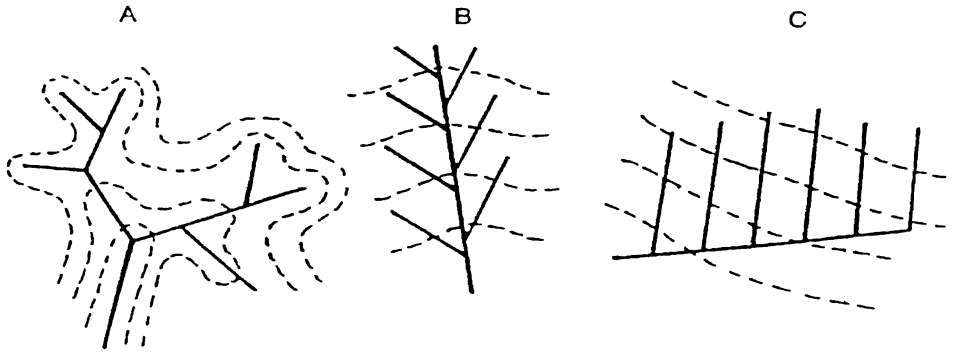
QUESTION 4: OPTIMAL RESOURCE UTILISATION

Start this question on a NEW page.

4.1 Data on soil, climate and topography are used to determine which crop or animal production policy would allow the soil to develop to its maximum agricultural potential. Name SIX steps that are involved in conducting a soil survey to enable you to utilise the soil for the most suitable type of production. (6)

4.2 Soil erosion remains a major threat for sustainable agricultural practices in South Africa today. Explain measures that must be taken to prevent soil erosion. (5)

4.3 The following diagrams A, B and C illustrate the layout of three different ways in which pipe drains can be planned.



4.3.1 Identify the systems illustrated by diagrams A, B and C. (3)

4.3.2 Indicate the type of terrain on which each of the illustrated systems should be used. (3)

4.3.3 State FIVE precautionary measures that should be taken when drainage pipes are installed. (5)

4.4 Answer the following questions on irrigation:

4.4.1 Briefly explain why the following factors should be considered for flood irrigation:

(a) Topography (1)
(b) Quantity of water available (1)
(c) Infiltration rate of the soil (1)
(d) Type of crop to be cultivated (1)
(e) Method of cultivation (1)

4.4.2 Name TWO types of flood irrigation that are practised in agriculture. (2)

4.4.3 Name TWO types of apparatus a farmer can use to determine when and how much irrigation water to apply. (2)

4.5 Briefly explain TWO factors which should be controlled to create the micro-climate in a greenhouse for crop cultivation. (4)
[35]

QUESTION 5: AGRICULTURAL ECONOMICS

Start this question on a NEW page.

5.1 Read the following case study based on agricultural economics and answer the questions that follow:

> The majority of women living in a village around one of the small towns in South Africa are unemployed and have a low level of formal school education while others have not attended school at all. Their standard of living is quite low due to unemployment and poverty. The lack of nutritious food, such as vegetables, appears to be most prominent in their daily diet. The local municipality has decided to help the community by establishing community vegetable gardens with sufficient water supply for sprinkler irrigation, and market stalls near bus and taxi ranks. All garden participants have been given fertilisers, vegetable seeds, a tractor and implements, namely a mouldboard plough and disc harrow. The garden is fenced off with a security fence to prevent any crop damage that may be caused by animals roaming around. All women involved in the gardening activities are presently producing various fresh vegetables that are sold at the market stalls. These producers, in most cases, produce the same types of vegetables which result in a surplus of the commodity at the market stalls. However, every producer strives to produce a high quality product. The market stalls open early in the morning and close at anytime in the evening as soon as there are no more buyers. Some women arrive late at the market because of first having to work in the gardens during the morning.

5.1.1 Identify TWO examples for each of the following agricultural capital goods from the case study:

(a) Fixed capital (2)
(b) Movable capital (2)
(c) Floating or working capital (2)

5.1.2 The case study indicates that the same types of vegetables are produced and this results in a surplus commodity.

(a) Explain the meaning of the term *surplus*. (2)
(b) Explain TWO disadvantages of surplus production in agriculture. (4)
(c) How would you solve the problem of surplus production in agriculture? (2)

5.1.3 Which marketing system would you associate with marketing activities in the case study? Give FOUR reasons to support your answer. (6)

5.2 Explain, with the aid of appropriate examples, why each of the following marketing functions is important in agriculture:

5.2.1 Standardisation (3)

5.2.2 Grading (3)

5.2.3 Processing (3)

5.3 Thorough planning is a requirement for the success of any farming enterprise. State the SIX steps that are involved in the planning process of a farming enterprise. (6)
[35]

TOTAL SECTION B: 150

GRAND TOTAL: 200