GAUTENG DEPARTMENT OF EDUCATION

PREPARATORY EXAMINATION

2010

10642

AGRICULTURAL SCIENCES

Second Paper

12 pages and an answer sheet

MARKS: 150
TIME: 2½ HOURS

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the ANSWER SHEET provided.
3. SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK.
4. Begin each question from SECTION B on a NEW page.
5. Study the questions carefully and make sure you answer what is asked.
6. Number your answers correctly according to the numbering system used in the question paper.
7. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and make a cross (X) in the block (A – D) next to the question number (1.1.1 – 1.1.10) on the attached ANSWER SHEET for SECTION A.

1.1.1 The primary natural resource is ...

A labourers.
B soil.
C capital.
D trees.

1.1.2 Characteristics that are passed from parent to offspring are ...

A GMO.
B variability.
C generation.
D heredity.

1.1.3 Mechanization in farming is a solution to the ...

A lack of schooling among labourers.
B cost of having labourers trained.
C increasing lack of farm labour.
D production of better products.

1.1.4 A reason why long-term credit is used, may be to ...

A pay debts.
B buy fertilisers.
C build a dam.
D buy cattle.

1.1.5 Which one is NOT an advantage of co-operative marketing?

A More power
B Lower marketing costs
C Grading of products
D Lower producer price

1.1.6 The marketing system by which the farmer may market his product as he wishes, is called ...

A the free market system.
B controlled marketing.
C single channel pool schemes.
D co-operative marketing.

1.1.7 A factor influencing the supply of a product:

A Usage of the product
B Buying power of consumers
C The number of consumers
D Increase in the price of the product

1.1.8 The Nguni cattle breed was developed as a result of indigenous knowledge. The offspring of this cattle breed would have the following characteristics:

(i) Very fertile
(ii) Resistant to ticks and disease
(iii) Large frame
(iv) Adaptability to extreme environmental conditions

Choose the correct combination:

A (i), (ii), (iii)
B (i), (ii), (iv)
C (i), (iii), (iv)
D (i), (ii), (iii), (iv)

1.1.9 The crossing of plants with red flowers (R) and plants with white flowers (r) will give only red flowers in the F1 generation. The genotype of the parent will be ...

A Rr x Rr.
B RR x rr.
C Rr x rr.
D RR x RR.

1.1.10 The difference between individuals of the same species is referred to as ...

A a histogram.
B normal distribution.
C variation.
D genes. (10x2) (20)

1.2 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A – H) next to the question number (1.2.1 – 1.2.5) on the ANSWER SHEET, for example 1.2.1 C

COLUMN A		COLUMN B	
1.2.1	Decreases the risk to income	A	fixed capital
1.2.2	Too much money spent in relation to other production factors	B	vegetation degradation
		C	soil degradation
1.2.3	The degree to which genetics determine a characteristic	D	electroporation
1.2.4	Cells of the recipient plant are incubated in a solution containing the desired genes and an electric current is passed through the solution	E	over-capitalizing
		F	insurance
1.2.5	This includes water erosion, wind erosion, salinity, acidification, water logging and loss of fertility.	G	heritability
		H	biometrics

(5x2) (10)

1.3 Give ONE word or term for each of the following descriptions. Write only the word or term next to the question number (1.3.1 – 1.3.5) on the ANSWER SHEET provided.

1.3.1 Chemical compound in the nucleus which stores genetic information.

1.3.2 The law that explains that the addition of successive units of one production factor does not result in a proportional increase in yield.

1.3.3 The process by which gametes are formed.

1.3.4 Telling people more about a product in order to persuade them to buy it.

1.3.5 A reproduction method used to produce an exact replica of the parent animal. (5x2) (10)

1.4 The underlined words in the following statements are **not correct**. Change the underlined term so that the statement will be correct.

1.4.1 Sometimes two different genes affect the same characteristic: the expression of one gene is controlled by another. This is called co-dominance.

1.4.2 The breed characteristic is the record of an individual's ancestors related to it through its parents.

1.4.3 Hedging is when a farmer has a different number of enterprises in order to spread the risk.

1.4.4 Heterosis is a gradual decrease in performance from generation to generation, produced by continual inbreeding.

1.4.5 Savings are money lent to a farmer by a financial institution.

(5x1) (5)

TOTAL SECTION A: 45

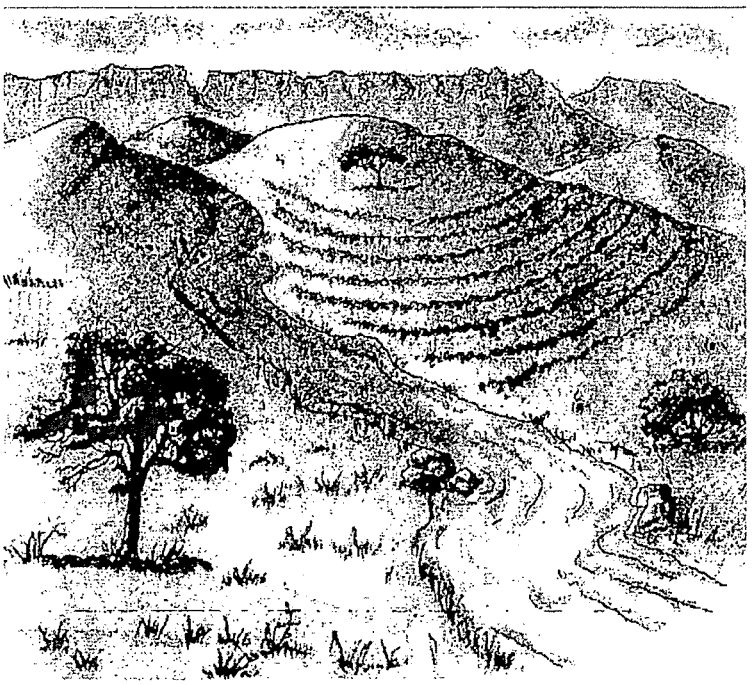
SECTION B

Begin this section on a NEW page in the ANSWER BOOK.

QUESTION 2

2.1 Read the following case study and answer the questions that follows.

> Mokgadi and her friend, Sanele, have recently acquired a 30-hectare piece of land near their village. This land is rented. After conducting an intensive research, they both decided to plant an indigenous crop, rich in starch and very much in demand by the local community and tourists. What they are not too certain about is whether their recently acquired land is suitable for this purpose.



2.1.1 In terms of natural resources, indicate THREE aspects they should investigate to determine whether their land is suitable for the intended purpose. (3)

2.1.2 State the functions of land within an agricultural production system. (4)

2.1.3 Discuss the following three important economical characteristics of land:

a. Availability (2)
b. Durability (2)
c. Indestructibility (2)

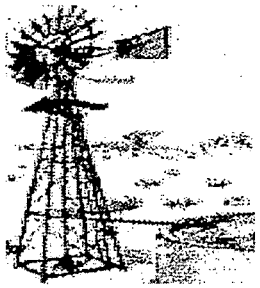
2.2 Read the following paragraph and answer the questions that follow.

> Small-scale farmers' access to finance remains a problem in South Africa. For commercial banks to lend money they need security, which in most cases is not available to small-scale farmers. Many small-scale farmers in South Africa are operating on communal land tenure and can therefore not provide land as security.

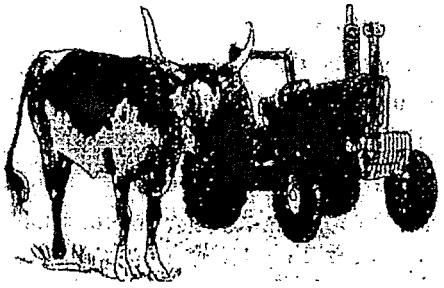
2.2.1 Explain what *communal tenure* is. (2)

2.2.2 Discuss the THREE different components of the land reform programme which was launched by the South African government in 1994. (6)

2.3 Study the illustrations below and answer the questions.



A



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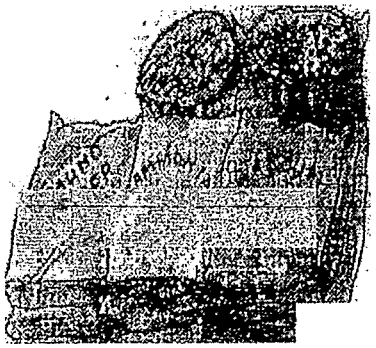
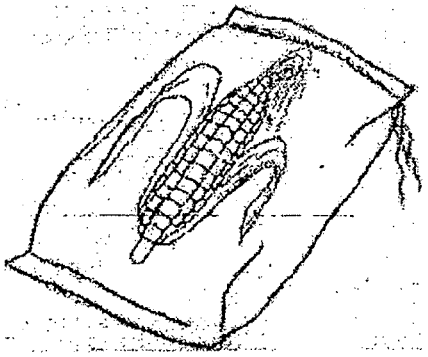
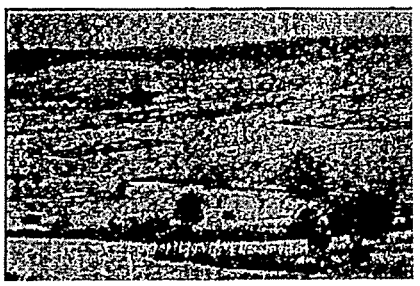


C



D

E



F

2.3.1 Write down the appropriate letter (A to D) of the item above that best fits the following statements:

a. Permanent durable asset (1)
b. This item is used to increase the quality of produce (1)
c. Sold to earn a yearly income for the entrepreneur (1)

2.3.2 Identify TWO production factors that are visible in the illustrations. Give the letter and a description of each. (4)

2.3.3 Give an example of a primary natural resource from the illustrations. (1)

2.4 Read the paragraph from *Farmers Weekly* 8 August 2008 and answer the questions that follow:

> Boetlap Pretorius, a farmer, is opposed to the minimum wage legislation. "I used to have 600 workers, but with the minimum wage legislation I now have only 60." He is frustrated that he is approached by elderly and disabled people who are starving and willing to offer work in exchange for food. "I believe that in a country of high unemployment, a minimum wage works against the poor." He plans to concentrate on less labour-intensive activities on his farm, such as beef cattle farming and game farming.

2.4.1 From the paragraph identify TWO reasons why Mr Boetlap Pretorius is opposed to the minimum wage legislation (2)

2.4.2 List TWO types of farm workers employed on farms. (2)

2.4.3 Identify TWO approaches Mr Pretorius followed to cope with the minimum wage legislation. (2)
[35]

Begin this question on a NEW page.

QUESTION 3

3.1 Read the following paragraph and answer the questions that follow.

> Mr John du Toit grows sweet potatoes and cabbage. He also has a small herd of beef cattle and some pigs. The sweet potatoes and cabbage are mainly grown for "bakkie" trade and for Fruit and Veg City, who collects 1000 cabbages daily. He is thinking about increasing his sweet potato plantings in future. Anything left over from this nutritious food benefits his livestock as he can feed non-marketable sweet potatoes to his pigs and cattle. By doing this nothing is wasted.

3.1.1 Indicate TWO ways in which Mr Du Toit can add value to his products. (2)

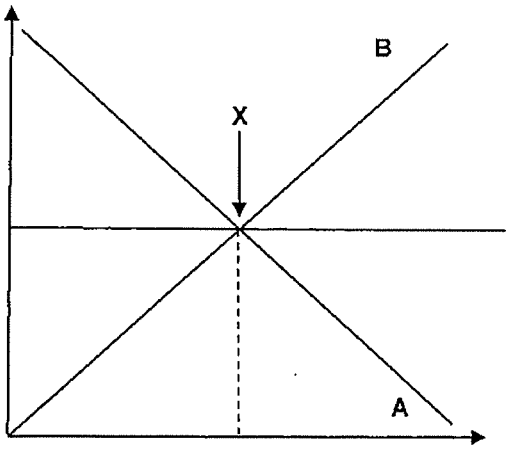
3.1.2 Explain how can he make sure that he markets his product successfully. (3)

3.1.3 Indicate TWO types of markets that Mr Du Toit supplies his products to. (2)

3.1.4 Indicate ONE main benefit of planting sweet potatoes. (1)

3.1.5 If you had to advise Mr Du Toit, identify THREE things he must consider before increasing the plantings of sweet potatoes. (3)

3.2 The following graph illustrates the supply and demand curve for milk production.



3.2.1 Identify the curves marked A and B respectively. (2)

3.2.2 Explain how milk producers will react when the price of the product increases. (2)

3.2.3 Name and discuss the situation at the point marked **X** on the graph. (3)

3.3 Explain what market research is. (2)

3.4 What is price elasticity and what influences price elasticity? (5)

3.5 Supply and demand determine the price of a product on the market.

3.5.1 Explain the concept *demand*. (2)

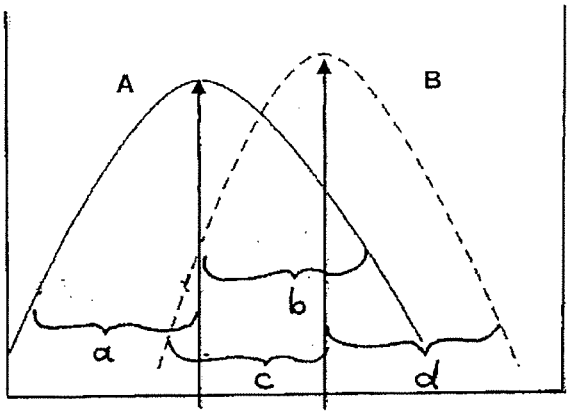
3.5.2 What are the factors that determine demand? (6)

3.5.3 What is meant by *supply*? (2)
[35]

Begin this question on a NEW page.

QUESTION 4

4.1 The following curves represent the milk production of a dairy herd (**A: solid line**) and that of the selected offspring (later generation) from the same herd (**B: dotted line**).



4.1.1 Explain why these graphs have a bell-shaped curve with the average in the middle. (2)

4.1.2 Why is the average milk production level of graph B higher than that of graph A? (2)

4.1.3 Which part of the selected offspring (graph B) would you select for breeding purposes: c or d? (1)

4.1.4 Which part of the population would you eliminate from your herd for breeding purposes? Give ONE reason for your answer. (2)

4.1.5 Indicate THREE of the selection aids that a farmer can use to improve his herd. (3)

4.2 The following is the selection index for a breed of beef cattle, the culling level is an indication of the breed standards.

		BULLS				
Trait	Culling level	A	B	C	D	E
Birth mass (kg)	42 (maximum)	47	33	40	39	35
Weaning mass at 7 months (kg)	250 (minimum)	290	230	255	270	280
Post weaning gain (kg/day)	1,2 (minimum)	1,5	1,4	1,2	1,3	1,4
Scrotal circumference (cm)	30 (minimum)	34	37	31	29	35

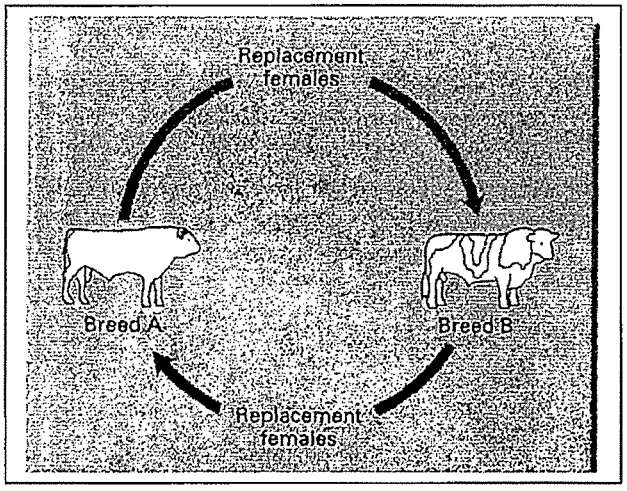
Evaluate the FIVE bulls (A – E):

4.2.1 Identify the THREE bulls that do not meet the breed standard and supply a reason why that bull should be culled. (6)

4.2.2 Which ONE of the five bulls is the best choice to use on heifers calving for the first time? Supply ONE good reason. (2)

4.3 Answer the following questions on crossbreeding.

4.3.1 Identify the following type of crossbreeding. (1)



4.3.2 Crossbreeding is regularly used as a tool in animal breeding. Give TWO examples where crossbreeding plays an important role. (2)

4.3.3 Name TWO advantages of crossbreeding. (2)

4.4 In cats the black (B) colour is dominant over white (b) and long hair (L) is dominant over short hair (l). A male BBll is mated with a female bb LL.

4.4.1 What is the phenotype of both the male and the female? (2)

4.4.2 Study the Punnett square of the F2 generation of the above-mentioned parents.

P2	BL	Bl	bL	bl
BL	BB LL	BB Ll	Bb LL	Bb Ll
Bl	BB Ll	BB ll	Bb Ll	Bb ll
bL	Bb LL	Bb Ll	bb LL	bb Ll
bl	Bb Ll	Bb ll	bb Ll	bb ll

Estimate which percentage of the offspring is:

a. black with long hair (2)
b. white with long hair (2)

4.4.3 Is the above-mentioned cross an example of a monohybrid or a dihybrid cross? (1)

4.5 What are the FOUR reasons for the genetic modification of crops? (4)

4.6 Give ONE argument against GM crops. (1)

[35]

TOTAL SECTION B: 105

GRAND TOTAL: 150

CENTRE NUMBER								

EXAMINATION NUMBER													

SECTION A

QUESTION 1.1

1.1.1	A	B	C	D
1.1.2	A	B	C	D
1.1.3	A	B	C	D
1.1.4	A	B	C	D
1.1.5	A	B	C	D
1.1.6	A	B	C	D
1.1.7	A	B	C	D
1.1.8	A	B	C	D
1.1.9	A	B	C	D
1.1.10	A	B	C	D

(10 x 2) (20)

QUESTION 1.2

1.2.1	
1.2.2	
1.2.3	
1.2.4	
1.2.5	

(5 x 2) (10)

QUESTION 1.3

1.3.1 _____

1.3.2 _____

1.3.3 _____

1.3.4 _____

1.3.5 _____

(5 x 2) (10)

QUESTION 1.4

1.4.1 _____

1.4.2 _____

1.4.3 _____

1.4.4 _____

1.4.5 _____

(5 x 1) (5)

TOTAL SECTION A: 45