education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P2

FEBRUARY/MARCH 2010

MARKS: 150

TIME: 2½ hours

This question paper consists of 18 pages and an answer sheet.

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK.
4. Start each question from SECTION B on a NEW page.
5. Read ALL the questions carefully and answer only what is asked.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Place your ANSWER SHEET for SECTION A (QUESTION 1) within your ANSWER BOOK.
8. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the 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. NO marks will be awarded if more than one cross (X) appears for an answer.

EXAMPLE:

1.1.11	X	B	C	D

1.1.1 One of the following business components is NOT part of a business plan:

A Name of business
B Marketing plan of business
C Cash-flow budget
D Description of business

1.1.2 Increasing the demand for a product remains a challenge for any producer. Using cultural values would be the most effective way for a maize producer to increase the market for his/her produce. This can be done by encouraging …

A a pig producer to use more maize meal for feed mixtures.
B rural and urban communities to eat more porridge made from maize meal with their meals.
C vegetarians to eat more products made from maize.
D a dairy farmer to utilise more maize meal in his dairy rations.

1.1.3 The law of demand for goods/products states that the …

A higher the price, the more goods/products will be supplied.
B lower the price, the more goods/products will be supplied.
C higher the price, the more goods/products will be bought.
D None of the above-mentioned

1.1.4 … is the first step in the development of the strategic management plan.

A Setting goals and objectives
B Developing the vision
C Evaluation
D Developing the mission

1.1.5 The farmer as an entrepreneur needs to effectively manage the farming enterprise. Planning forms a vital part of the management process. Which of the following documents is directly linked to planning as a management principle?

A Inventory
B Budget
C Rainfall recordings
D Labour contract

1.1.6 A crop farmer acquired land in a unique ecological region and would like to plan for and utilise this land optimally, taking into consideration the soil types, soil potential, topography, slope and orientation of the land. To reach this goal the farmer needs to consult and understand the … of that region.

A aerial photographs
B satellite images
C land-use classes
D demographic maps

1.1.7 The economic characteristic of land to be regarded as a sound investment, is its …

A production potential.
B erodibility.
C chemical composition.
D fixed location.

1.1.8 The net worth of a business is defined as …

A the total assets of the business minus the liabilities.
B the total liabilities of the business minus the assets.
C the total expenditure of the business minus the income.
D the total income of the business minus the expenditure.

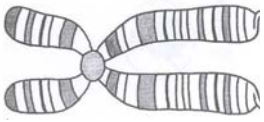
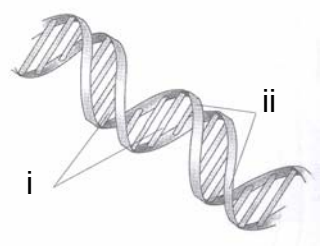
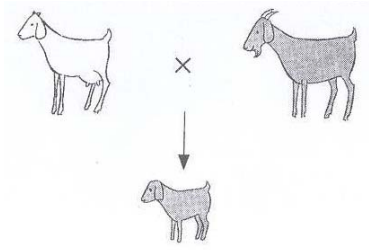
1.1.9 The phenotype of an animal could be described as the …

A total product of the environmental variation.
B sum of the environmental variation and genetic variation.
C total product of the genetic variation.
D length and depth of the animal body.

1.1.10 A heterozygous Brahman bull (Bb) was mated with a heterozygous cow (Bb). The expected phenotypic ratio in their F1 generation will be …

A 1:2:1.
B 1:1.
C 3:1.
D 1:3:1. (10 x 2) (20)

1.2 Match the picture in COLUMN A with the description in COLUMN B. Write only the letter (A – J) next to the question number (1.2.1 – 1.2.5) on the attached ANSWER SHEET, for example 1.2.6 N.

COLUMN A	COLUMN B
1.2.1 	A the smallest unit that has the ability to carry genetic information
1.2.2 	B a strategic planning session is a prerequisite for the implementation of policy and for the achievement of objectives
1.2.3 	C the structure that is modified during the process of genetic engineering
1.2.4 	D complete dominance
1.2.5 	E distance to the markets is a problem with the marketing of agricultural produce
	F dihybridism
	G incomplete dominance
	H perishability of produce is a factor which hampers the marketing of agricultural produce
	I control is an important factor in management
	J the structure that represents a gamete

(5 x 2) (10)

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

1.3.1 People who recognise business opportunities and are willing to take the risk of starting their own business

1.3.2 The programme that addresses previous discriminatory apartheid policies and ensures that previously disadvantaged people have access to land

1.3.3 When too much capital is invested in a farming endeavour, thus causing the interest liability per unit to increase

1.3.4 Where two hereditary factors on two different chromosomes are involved in cross-breeding

1.3.5 The modification of the DNA resulting in a change in the sequence of the genes (5 x 2) (10)

1.4 Change the UNDERLINED WORD(S) in the following statements to make them TRUE. Write the appropriate word(s) next to the question number (1.4.1 – 1.4.5) on the attached ANSWER SHEET.

1.4.1 Physical and human endeavours performed in the expectation of remuneration is commonly referred to as <u>marketing</u>.

1.4.2 The method of dividing the market for agricultural products into smaller groups of buyers is called market <u>diversification</u>.

1.4.3 In the stages of the marketing chain, accidents, theft and spoilage could be regarded as <u>processing</u>.

1.4.4 The <u>business</u> contract is an agreement to buy/sell a certain quantity of a product at a given price at a predetermined date in the future.

1.4.5 <u>Prepotency</u> is the appearance in a population of a characteristic determined by a homozygous recessive gene. (5 x 1) (5)

TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page.

QUESTION 2: AGRICULTURAL MANAGEMENT

2.1 Gert is a dairy farmer who lives on a farm in an area of the country where black wattle and Rooikrans trees grow in large numbers. His dairy operation is under severe financial constraint because of the decrease in the price of milk. He can hardly afford the normal running cost of this dairy operation.

Gert has come to know that the government has passed a law that all alien trees must be removed from properties. He is considering starting a service which could assist farmers and property owners in his area. He would cut down the trees for farmers at minimal cost and for the ownership of the wood.

2.1.1 Indicate whether Gert's tree-cutting venture can be considered an entrepreneurial opportunity. Give a reason to support your answer. (2)

2.1.2 Briefly explain FOUR possible changes to be considered when changing from a dairy operation to a wood operation. (4)

2.1.3 Name TWO possible ways that Gert would use to add value to the product. (2)

2.1.4 A paper mill in the area has offered Gert a contract if he succeeds in starting his operation. Draw a schematic representation of a marketing chain from the data supplied, in which this paper mill is included. (3)

2.2 The following is a budget for a rose producer. The roses are produced by an emerging small-scale farmer who set up this enterprise as part of an AgriBEE initiative. The production of roses takes place in a greenhouse on a small holding.

The budget below shows estimates for the 2009/2010 financial year. The fixed capital budget is not included.

Estimated cost			**Estimated returns**		
Item	**Amount**		**Item**	**Amount**	
Water	10 300	00	Roses (floral shop)	350 000	00
Manure	22 345	45	Roses (nursery)	120 000	00
Labour	24 500	00	Compost	7 500	00
Electricity	13 308	00			
Potting soil	8 800	00	**Total returns**		
Vegetative material	45 555	50			
Chemicals	18 756	30			
Total costs					

2.2.1 Indicate the management principle that this budget addresses. (1)

2.2.2 Deduce THREE possible markets from the data above, that this farmer targets for the rose production enterprise. (3)

2.2.3 Calculate the possible profit that the farmer could generate from this enterprise. (3)

2.2.4 Name TWO possible ways in which the AgriBEE programme could have assisted this farmer in his/her enterprise. (2)

2.3 The passage below describes an invention in which wine is stored.

New ideas for old

The skin, used thousands of years ago to store wine in, is back in use and in favour, only the skin is now made of plastic. For convenience, it is placed in a waxed cardboard box and there is a tap on the skin projecting through the bottom of the box. This means that, as the wine is poured through the tap, the skin collapses. No air – and thus no bacteria – enters and the wine keeps longer.

The box wine concept was invented by Tom Angrove of Angrove's, a winemaker from Australia, and was patented in 1965. The chief advantage of bag-in-a-box packaging for wine is that it prevents the wine oxidising. Unlike bottled wine, which is oxidised by the volume of air in the bottle which has displaced the wine already poured, wine in a bag is never touched by air and thus never subject to oxidation until it is poured. Other advantages include greater efficiency of storage and transportation of the rectangular boxes, and removing the risk of breakage incurred by transporting wine in bottles.

At first there was resistance to the idea, but the concept of box wine has caught on around the world. No longer reserved for low quality wines, the box concept has earned its inventor millions.

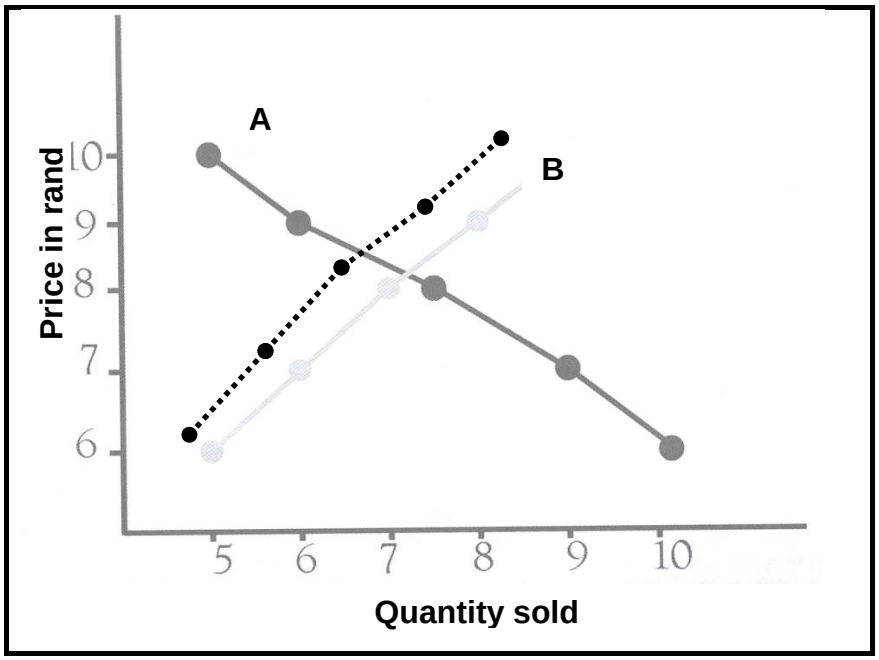
2.3.1 Establish the function for which the product indicated above is used. (1)

2.3.2 Identify TWO innovative essential points that have been added to the wine skin. (2)

2.3.3 Name TWO entrepreneurial skills that were used by Tom Angrove in his invention. (2)

2.3.4 Name FOUR advantages of using this product. (4)

2.4 The following graph represents a hypothetical supply-demand curve for an agricultural commodity:



2.4.1 Write the symbol, indicated as A or B, in the graph above for the following:

(a) The hypothetical demand curve (1)

(b) The hypothetical supply curve (1)

2.4.2 Discuss the stage at which the market would experience a shortage of products by referring to the graph above. (2)

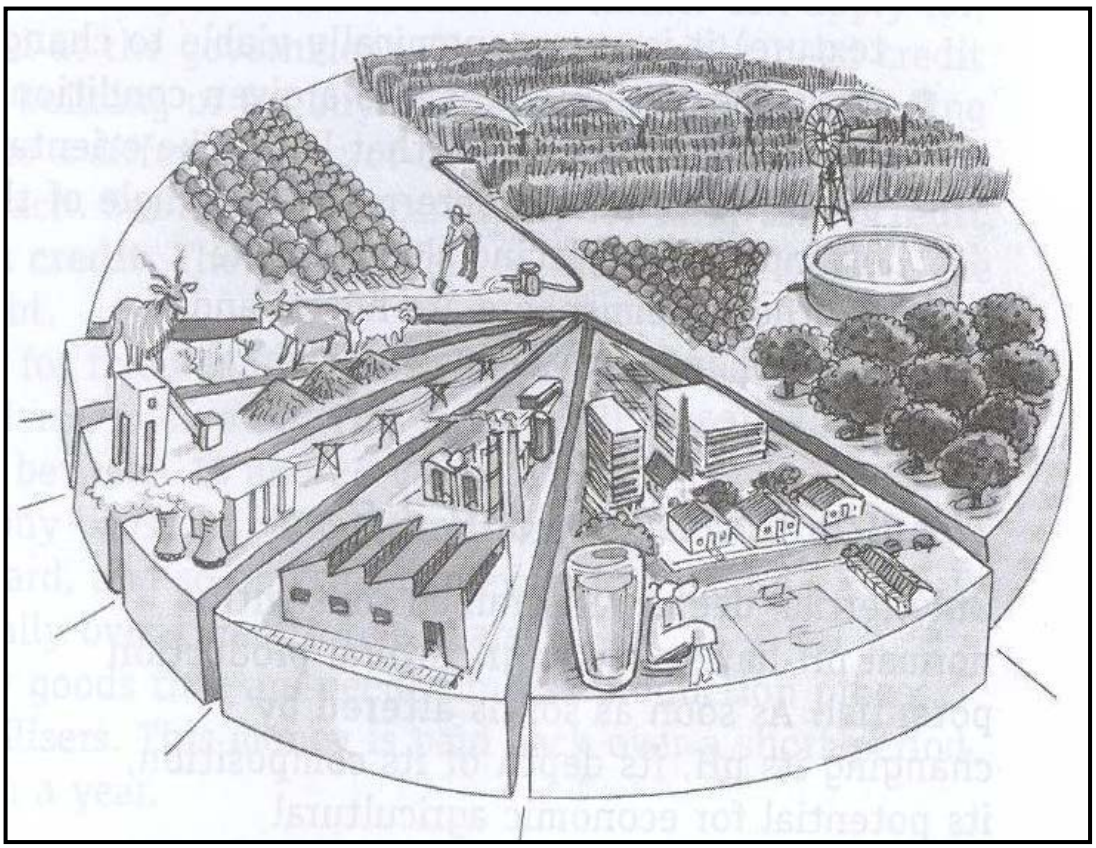
2.4.3 Identify the price that suggests market equilibrium in the graph above. (1)

2.4.4 State a possible way for farmers to prevent an oversupply of an agricultural product. (1)
[35]

Start this question on a NEW page.

QUESTION 3: PRODUCTION FACTORS AND MANAGEMENT

3.1 The pie diagram below illustrates the usage of water resources in South Africa.

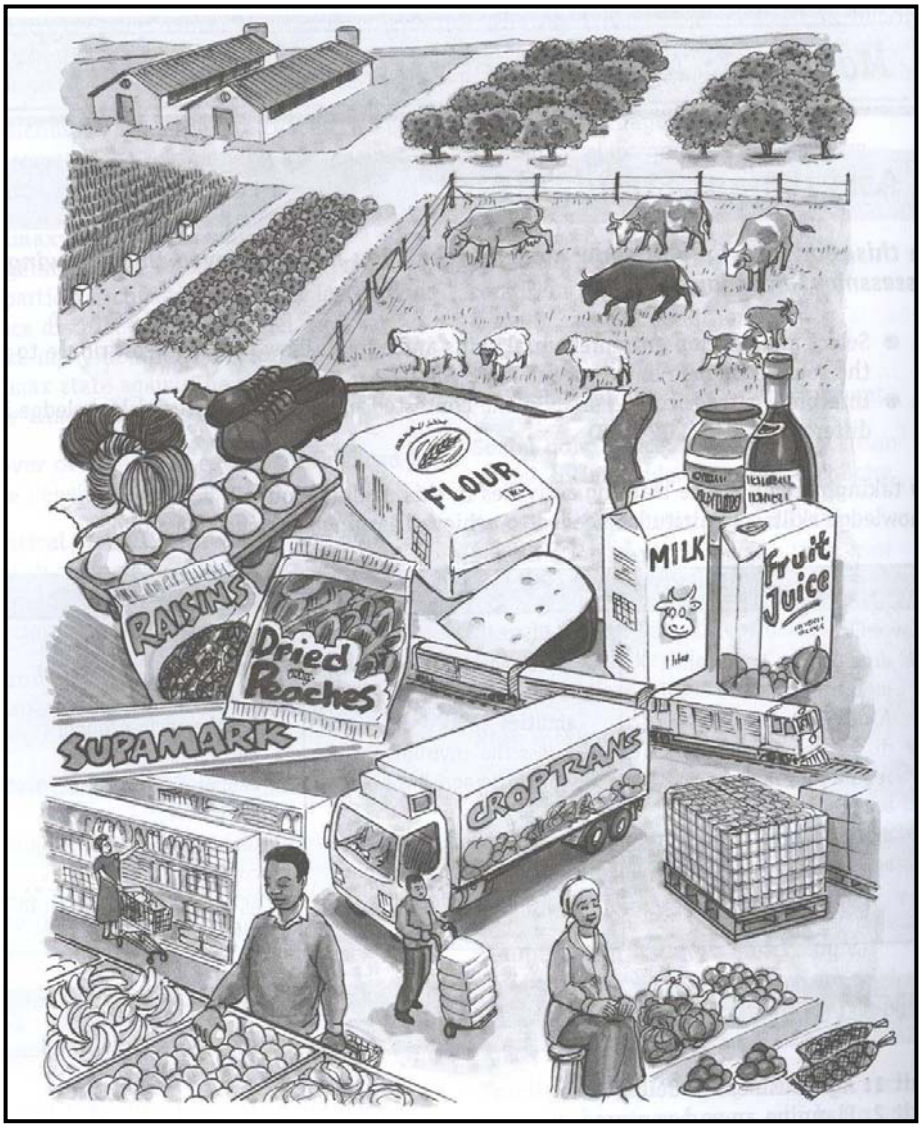


3.1.1 Indicate the sector in the diagram above which uses the most water. Give a reason to support your answer. (2)

3.1.2 Name THREE objects/features visible in the diagram above that are linked to capital, labour and land. (3)

3.1.3 Identify a method used in the diagram above to increase agricultural output. (1)

3.2 The diagram below represents an agribusiness chain.



3.2.1 Explain the meaning of an *agribusiness chain* by referring to the diagram above. (2)

3.2.2 Identify each of the following examples directly related to the primary production process from the diagram above:

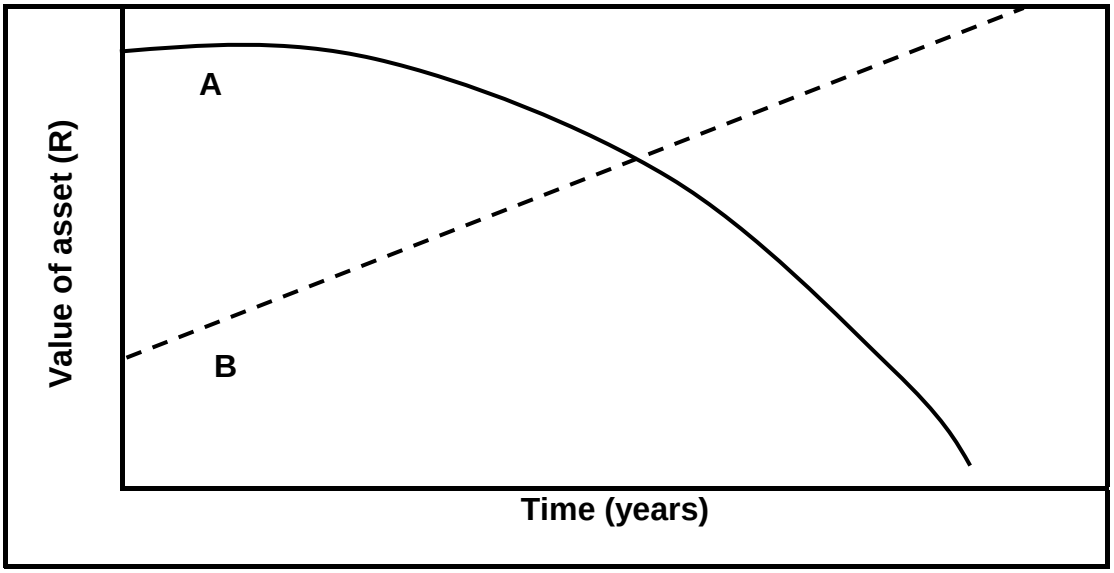
(a) A movable-capital item (1)

(b) A fixed-capital item (1)

3.2.3 Name TWO possible types of labour that the farming enterprise illustrated above would utilise. (2)

3.2.4 Name any TWO possible signs visible in the diagram above that indicate that the farm is managed well. (2)

3.3 A wheat farmer has to take into consideration that some assets are subject to wear and tear and loose their value over time. Some are more durable and gain value over time. The following graph represents the values in rand for assets in a wheat production enterprise:



3.3.1 Indicate the graph (A or B) that represents the movable assets on this wheat farm. Give a reason for your answer. (2)

3.3.2 The graphs above could assist the wheat farmer in mechanisation planning. Give examples of TWO items that would be involved in mechanisation planning. (2)

3.3.3 Assets represented by graph B could serve as a good investment for a farmer. Give TWO reasons to support this statement. (2)

3.3.4 Explain the meaning of overcapitalisation and indicate how it could influence the value of assets of a wheat farmer. (2)

3.4 Below are three candidates that applied for two positions at a large commercial farming enterprise.


Candidate 1


Candidate 2


Candidate 3

3.4.1 The farmer wants to implement gender equity on this farm. There is a perfect gender ratio on the farm at the moment. Suppose all three candidates' scores are equal on their interview assessment. Indicate the TWO possible candidates that you would appoint for these positions. Give a reason to support your answer. (3)

3.4.2 Identify the Act that will protect the basic interests of these candidates when they get appointed into the positions in this farming enterprise. (2)

3.4.3 Create a basic contract of employment that both the employee and employer need to sign that would protect the interests of both. (4)

3.4.4 Suggest TWO ways to improve the productivity of the labour force in this farming enterprise. (2)

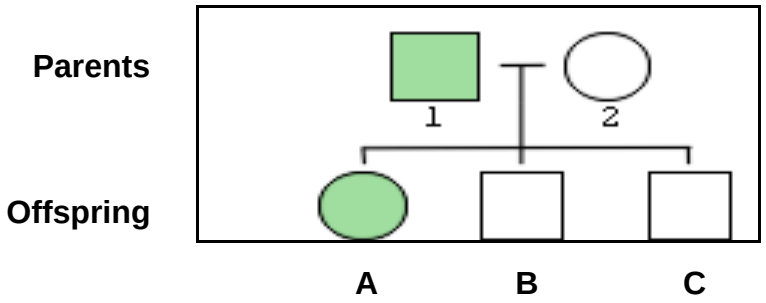
3.4.5 One of the female workers who works in the milking parlour reported to the farm manager that she had been raped. This happened late Saturday afternoon after completing her duties and while she was walking home.

Suggest TWO actions that the farm manager needs to take immediately to support this female worker. (2)
[35]

Start this question on a NEW page.

QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1 The schematic representation below represents the crossing between two parent animals with different traits. The one trait is represented by colour (dark colour or white) and the other by the shape of the diagram (square or circle).



4.1.1 Indicate the percentage of genetic material that each of the offspring receives from each of the parents. (1)

4.1.2 Tabulate the traits (shape and colour) that each of the offspring, indicated by A, B and C in the schematic representation, received from the parent marked 2. (3)

4.1.3 Deduce from the schematic representation and data supplied above the TWO possible traits (shape or colour) that are dominant when the offspring is compared to the parents. (2)

4.2 The table below represents data generated from a trial with genetically manipulated (GM) maize. GM maize was compared to non-GM maize with regard to yield and damage to cobs by the maize stalk borer.

Province	Non-GM maize		GM maize	
	Grain yield	Damaged cobs	Grain yield	Damaged cobs
	kg/ha	%	kg/ha	%
Eastern Cape	8 970	3,4	9 870	0,0
Gauteng	5 700	1,0	7 900	0,0
North West	7 700	1,2	8 800	0,0
Mpumalanga	4 900	1,0	5 700	0,0
KwaZulu-Natal	3 790	30,9	4 400	1,3

4.2.1 Draw a bar graph to compare the yield performance of the two maize products with each other in the different provinces mentioned above. (6)

4.2.2 Indicate the province which was worst affected by the maize stalk borer. (1)

4.2.3 Calculate the percentage increase in production yield that was measured in Gauteng between the use of GM maize cultivars and non-GM maize cultivars. (3)

4.2.4 Name TWO possible advantages that GM maize cultivars have with reference to the data above. (2)

4.3 Read the case study below of Mr Kobus Stofburg's breeding programme of dairy breeds.

Kobus Stofburg, of the farm *Hou moed* in the Western Cape, has been cross-breeding with the SA Dairy Swiss for many years and is very happy with the results. When he took over the Holstein herd, the cows were not in a very good condition. The udders, bodies and the legs had problems. These cows were then cross-bred with the SA Dairy Swiss bull and Kobus was very pleased with the results. He noted an immediate improvement in the body size, frame, hooves, legs and udders. The growth rate of the crossed calves was incredible.

A bonus for Kobus is that he gets an extra R100 for the bull calves. The breed's temperament is good and the cattle have long, productive lives. He says that, because of the high temperatures on the farm, Holsteins often head for the shade in the heat of the day, but the SA Dairy Swiss continue grazing, thus producing more milk.

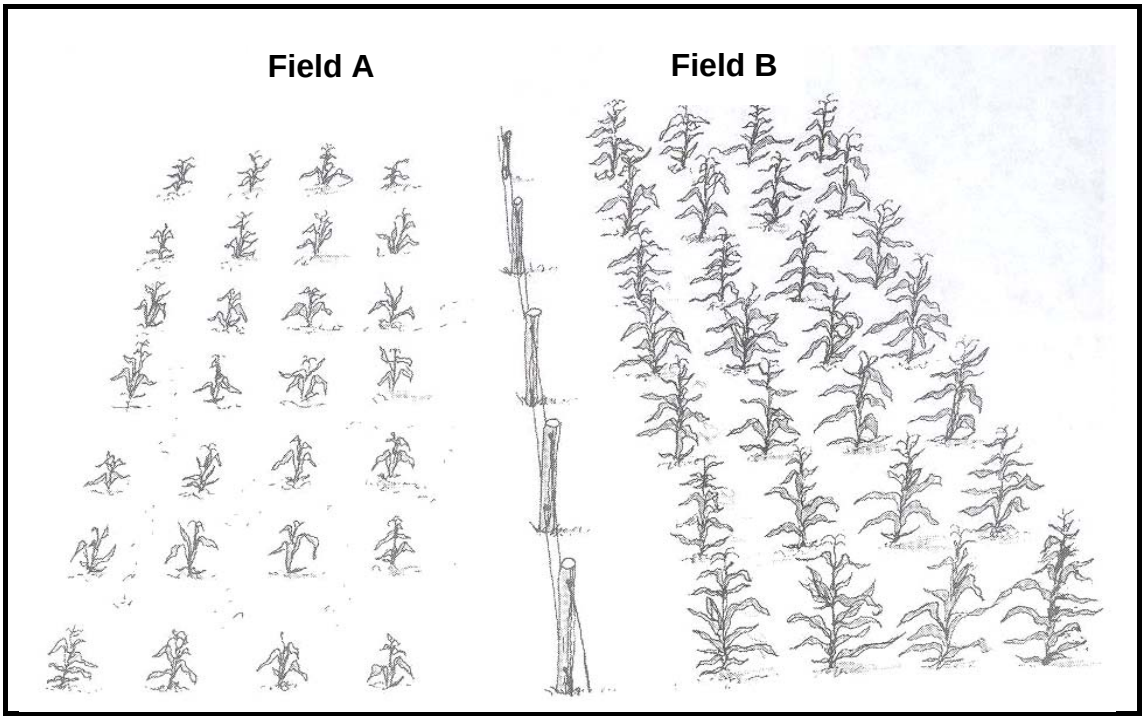
4.3.1 Identify TWO quantitative traits/characteristics that were observed by Kobus after mating the two breeds. (2)

4.3.2 Identify THREE reasons from the case study above that support the following statement: "The SA Dairy Swiss bull has dominant genes." (3)

4.3.3 Name the TWO specific breeds of parents that were used in this breeding programme. (2)

4.3.4 Suggest the method of breeding that is applicable at *Hou moed* farm and substantiate your answer. (2)

4.4 The diagram below depicts the causes of variation in plants.

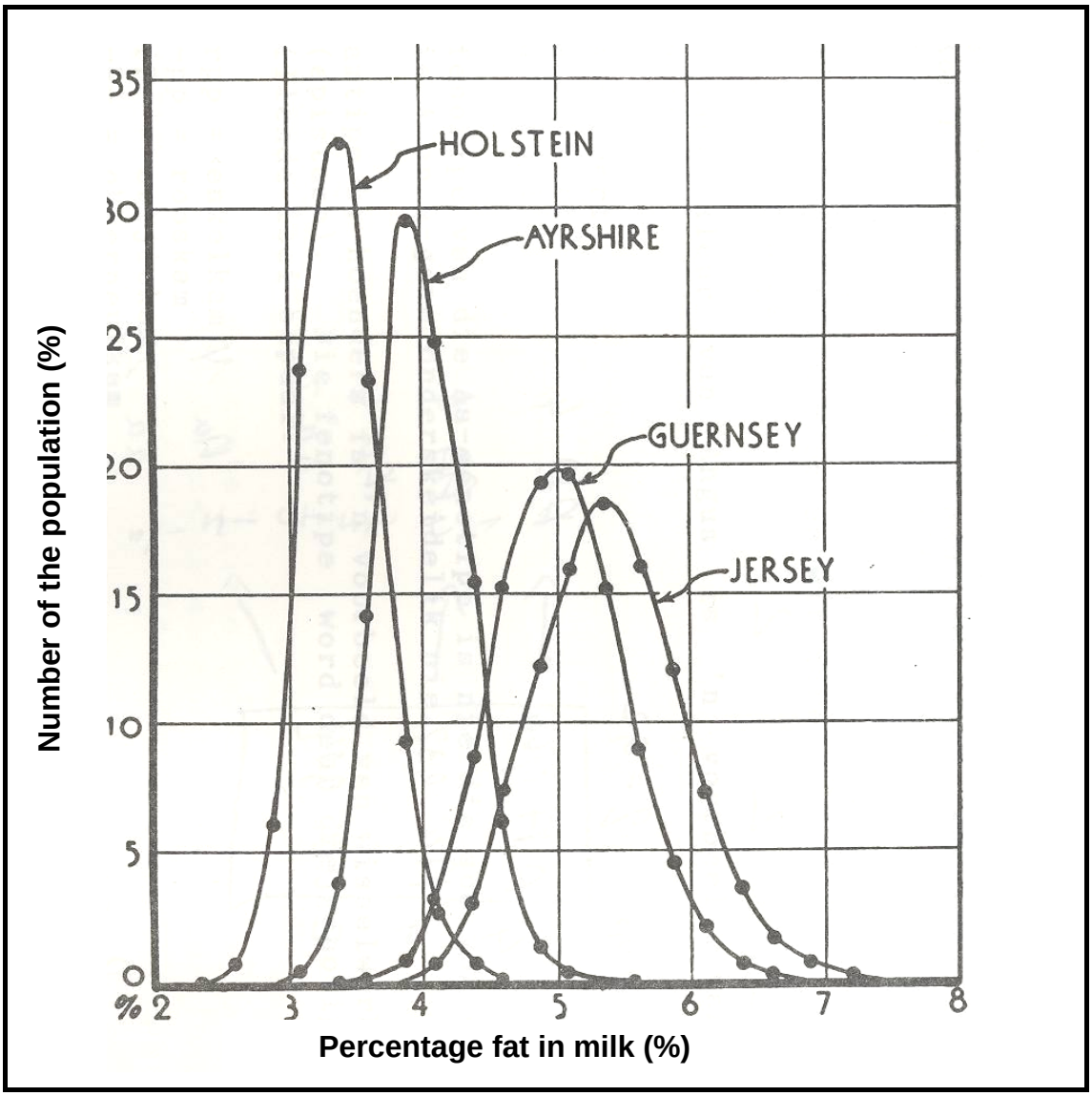


The crops in Field A and Field B both come from the same seed with the same genes for height and were planted at the same time in different areas.

4.4.1 Suggest THREE external factors that might have greatly contributed to the difference in the heights of the plants in the two fields. (3)

4.4.2 Identify ONE dependent variable that the scientists were trying to investigate on these fields. (1)

4.5 The graph below indicates the variation in the fat content of milk of individuals of the dairy breeds.



4.5.1 Identify the breed with the lowest fat content. (1)

4.5.2 Deduce from the graph above the breed with the smallest variation for fat content. (1)

4.5.3 Identify the breed you would recommend in a cross-breeding programme to get the largest improvement of fat content in milk production. (1)

4.5.4 Determine a reason for the bell-shaped variation curve indicated above. (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