



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2009

MARKS: 150

TIME: 2½ hours

This question paper consists of 16 pages and 1 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) in 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.

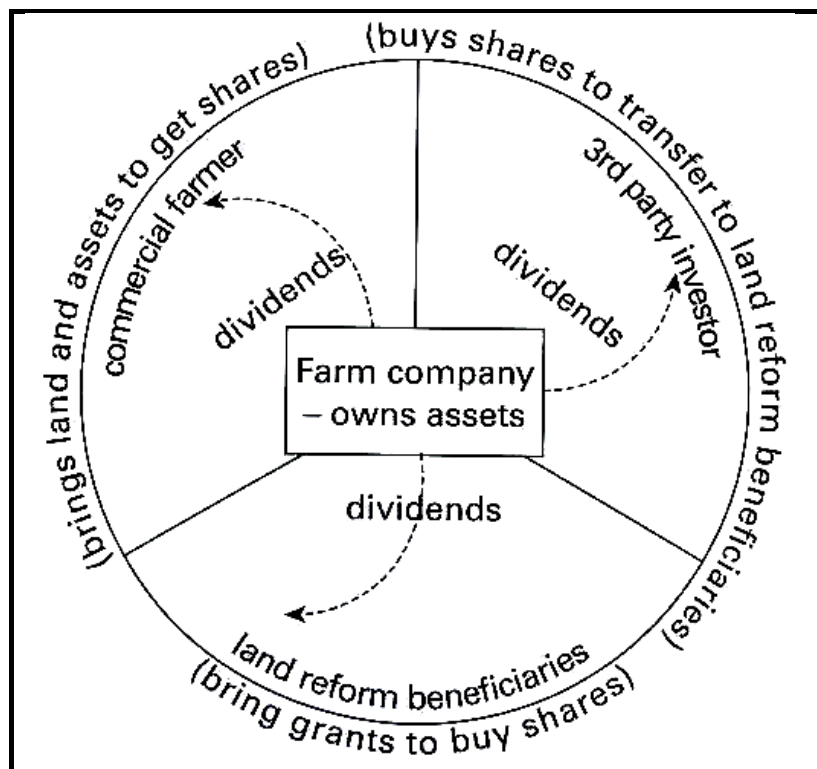
Example:

1.1.11	X	B	C	D
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1.1.1 The risk of marketing agricultural products can be reduced by ...

- A insurance coverage.
- B competition.
- C over-supply of the product.
- D under-supply of the product.

1.1.2 The following schematic representation refers to a unique ownership model for land.



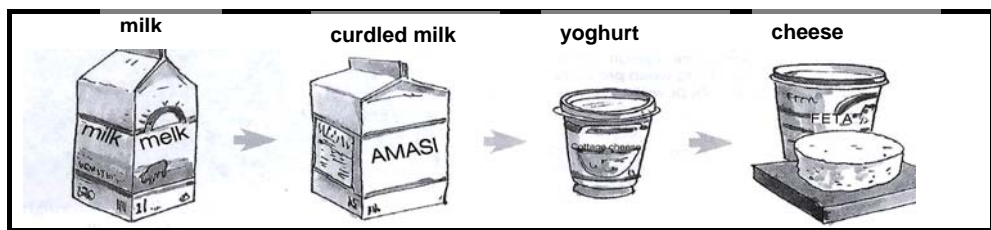
This model is best described by the following phrase:

- A A 'private tenure of land' scheme
- B An equity scheme
- C A 'communal tenure of land' scheme
- D A cooperative scheme

1.1.3 At the beginning of October, peaches are more expensive than at the end of January, because ...

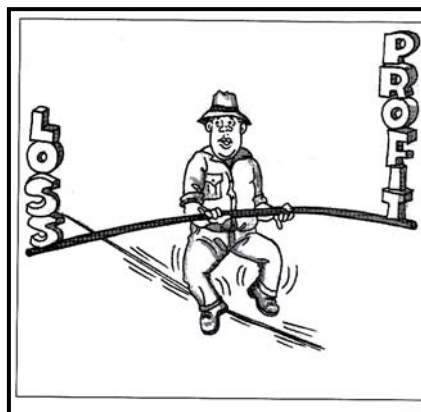
- A the supply of peaches to the market is strictly controlled during October.
- B it costs more to have peaches on the market early in December.
- C the supply of peaches in October is still limited.
- D the earlier fruit has a better taste and quality.

1.1.4 The product handling function that is indicated by the illustration below refers to ...



- A grading.
- B transport.
- C standardisation.
- D value-adding.

1.1.5 Choose a factor illustrated by the picture below related to the biggest challenge in a farming enterprise. This challenge involves coping with unpredictable climatic conditions and fluctuating prices.



- A Income
- B Risk
- C Expenditure
- D Gross margin

- 1.1.6 The following statement is NOT part of a strategic management plan for a farming enterprise:
- A Vision statement
 - B Mission statement
 - C Business strategy
 - D Soil and climatic data
- 1.1.7 Floating capital borrowed at exceedingly high interest rates usually leads to ...
- A larger profits.
 - B over-capitalisation.
 - C a shortage of capital.
 - D higher investment.
- 1.1.8 The flow of labourers from the agricultural sector to the industries may be due to ...
- A better wages, working and service conditions.
 - B the literacy of workers.
 - C less strenuous work.
 - D better management.
- 1.1.9 A heterozygous individual has the following genotype for a qualitative genetic characteristic:
- A One dominant allele
 - B One dominant and one recessive allele
 - C Two dominant alleles
 - D Two recessive alleles
- 1.1.10 BB represents a black colour and bb represents a red colour in a horse breed. The Punnett square below represents the genotype of the offspring. Black is the dominant trait. The phenotype of this offspring will be ...

	Hackney pony mare		
	b	b	
Percheron stallion	B	Bb	Bb
	B	Bb	Bb

- A 100% red.
- B 50% red and 50% black.
- C 100% black.
- D 25% black and 75% red.

(10 x 2) (20)

1.2 In the table below a statement with TWO possible answers is given. Decide whether the statement in COLUMN B relates to A only, B only, both A and B or NONE of the answers in COLUMN A. Make a cross (X) in the block (A – D) next to the question number (1.2.1 – 1.2.5) on the attached ANSWER SHEET.

Example:

COLUMN A		COLUMN B
A:	operator	A person that sees a business opportunity and is prepared to take a risk to make it a reality
B:	entrepreneur	

Answer:

The statement refers to:			
A ONLY	B ONLY	A AND B	NONE
A	B	C	D

COLUMN A		COLUMN B	
1.2.1	A:	Labour shortages	The main effects of HIV/Aids on agriculture
	B:	Loss of agricultural knowledge and management skills	
1.2.2	A:	Organising	Principles of management applied to the production of crops and livestock
	B:	Innovation	
1.2.3	A:	Temperature	An environmental condition that will influence the phenotype of an organism
	B:	Rain	
1.2.4	A:	Law of variation	Laws of Mendel that could be applied in animal production
	B:	Law of segregation	
1.2.5	A:	Heterozygous	Individual with two of the same alleles for a gene
	B:	Homozygous	

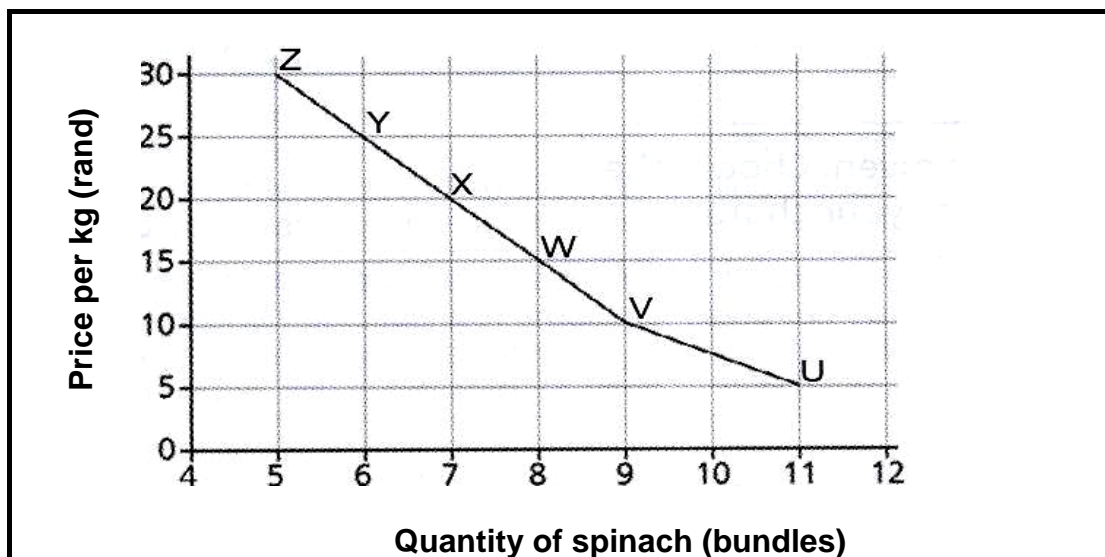
(5 x 2) (10)

- 1.3 Give ONE term/phrase for each of the following descriptions. Write only the term/phrase next to the question number (1.3.1 – 1.3.5) on the attached ANSWER SHEET.
- 1.3.1 The transformation of agricultural produce into a different product
- 1.3.2 Credit used by a farmer to buy fertilisers
- 1.3.3 The law that explains that the addition of successive units of one production factor does not result in a proportional increase in yield
- 1.3.4 The study of the inheritance of characteristics from generation to generation
- 1.3.5 A reproduction method used to produce a replica of the parent animal (5 x 2) (10)
- 1.4 Change the UNDERLINED WORD in each of the following statements to make them TRUE. Write the appropriate word next to the question number (1.4.1 – 1.4.5) on the attached ANSWER SHEET.
- 1.4.1 The relationship between a change in price and a change in demand for the produce is called price equilibrium of demand.
- 1.4.2 Demand is the term indicating the amount of a commodity that a producer is willing to market.
- 1.4.3 Savings are money lent to a farmer by a financial institution.
- 1.4.4 Demarcation is a strategy that the farmer uses to reduce risk by having a number of different enterprises on his/her farm.
- 1.4.5 A recessive allele will always affect an individual animal's phenotype. (5 x 1) (5)

TOTAL SECTION A: 45

SECTION B**START THIS QUESTION ON A NEW PAGE.****QUESTION 2: AGRICULTURAL MANAGEMENT**

2.1 The graph below represents the price of spinach at different price levels.



- 2.1.1 Identify the type of marketing curve that is illustrated above. (1)
- 2.1.2 Deduce the price of spinach at point W on the graph above. (1)
- 2.1.3 Briefly explain the reaction at the market when households buy more spinach during a specific period of the year. (2)
- 2.1.4 Explain how market equilibrium could be reached. (2)

2.2

The Makhado family lives in a rural area in South Africa. The family has a special interest in livestock breeding. This family uses indigenous farming practices similar to those of their older generations. They have learned that when cattle are slaughtered, every bit of a carcass should be used. The best quality meat is used as fresh meat, some other parts are dried and low quality meat is processed and preserved. Some fat is used for cooking meals whilst the hide is processed into traditional clothing and sandals.

- 2.2.1 Distinguish between the TWO systems of processing indicated in the scenario above. (3)
- 2.2.2 State the Makhado family's main approach when slaughtering and processing the carcass. (2)
- 2.2.3 Identify TWO characteristics that the best quality meat in a carcass would have, which the Makhado family uses as fresh meat. (2)

- 2.3 The following tables represent quantities demanded at different prices for two agricultural products:

PRODUCT 1

Price (R)	10	20	30	40	50	60	70	80	90	100
Quantity	100	65	50	40	30	25	20	15	10	5

PRODUCT 2

Price (R)	10	20	30	40	50	60	70	80	90	100
Quantity	75	55	50	45	45	40	40	35	30	25

- 2.3.1 Plot the above values on a line graph for both products. (6)
- 2.3.2 Identify the quantity demanded at a price of R45,00 for Product 1. (1)
- 2.3.3 Indicate the difference in the quantity demanded for Product 1 and Product 2 at the same price of R45,00. (1)
- 2.3.4 State how the supply of agricultural products is influenced by the demand. (2)
- 2.3.5 Discuss how the following factors might affect the demand for agricultural products:
- (a) Quality (2)
- (b) Tradition (festive seasons) (2)

- 2.4

Marketing fruit and vegetables is a bit like going to school. You have to start at the bottom and work your way up to 'qualify' to write Grade 12. Marketing fresh produce is no different.

Three options exist for farmers to market their fruit and vegetables:

- Farm gate sales, also known as the bakkie trade. This is the most basic form of marketing.
- Local area sales whereby you supply local retail businesses and supermarkets in your area or district.
- Factory contracts. This is your best option where you market your produce according to a contract with a factory.

[Source: Adapted from *Farming SA*, November 2008]

- 2.4.1 Describe TWO factors that show the importance of marketing for the farmer. (2)
- 2.4.2 Name TWO options/channels of marketing fruit and vegetables, as may be practised in your area. (2)

2.4.3 A group of farmers who have recently established a fruit and vegetable production enterprise approach you for advice on how to market their produce.

Critically discuss factory contracts as an option for marketing their produce.

(3)

2.4.4 Give an alternative term for *farm gate sales*.

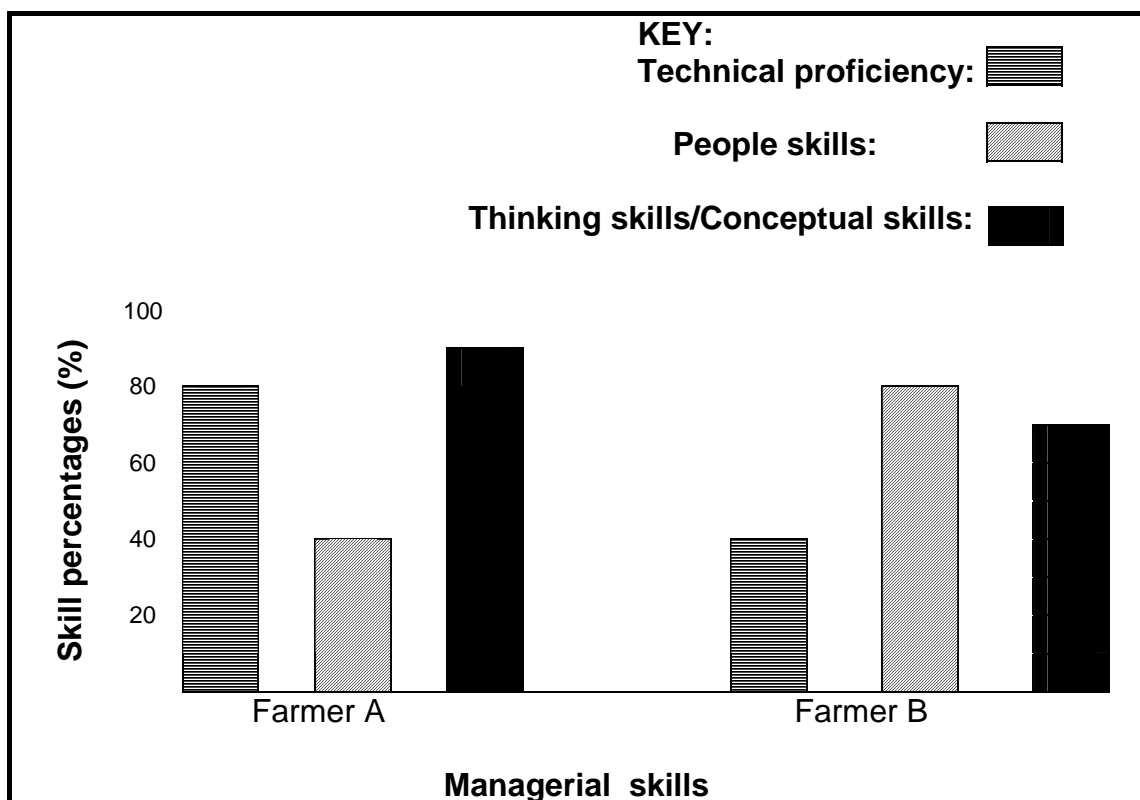
(1)

[35]

START THIS QUESTION ON A NEW PAGE.

QUESTION 3: PRODUCTION FACTORS AND MANAGEMENT

3.1 The ideal employee will be a person who is well trained, loyal and willing to co-operate. If the farmer treats the workers fairly, they will be motivated to perform better. Proper planning will also increase job satisfaction. The bar graphs below indicate the managerial skills of two farmers.



3.1.1 Identify the farmer (A or B) that has the necessary skills to manage a farm optimally. Explain your answer by referring to the bar graphs above.

(4)

3.1.2 Explain how the farmer will increase labour productivity under the following headings:

- (a) Economic conditions
- (b) Environmental conditions
- (c) Educational conditions

(6)

3.2

CASE STUDY: GETTING AGRICULTURE TO TOE THE LINE

After complaints of abuse in the farming sector, the South African Human Rights Commission (SAHRC) undertook a comprehensive national inquiry into the matter. Their report indicated that some commercial farmers might be guilty of abuse, although they were not the only ones to be targeted as guilty by the commission.

It was also reported that evictions are still going on in spite of the promulgation of legislation to prevent it.

The social life as well as safety of farming communities was also found to be worrying factors.

[Adapted from: *Farming in SA*, November 2008]



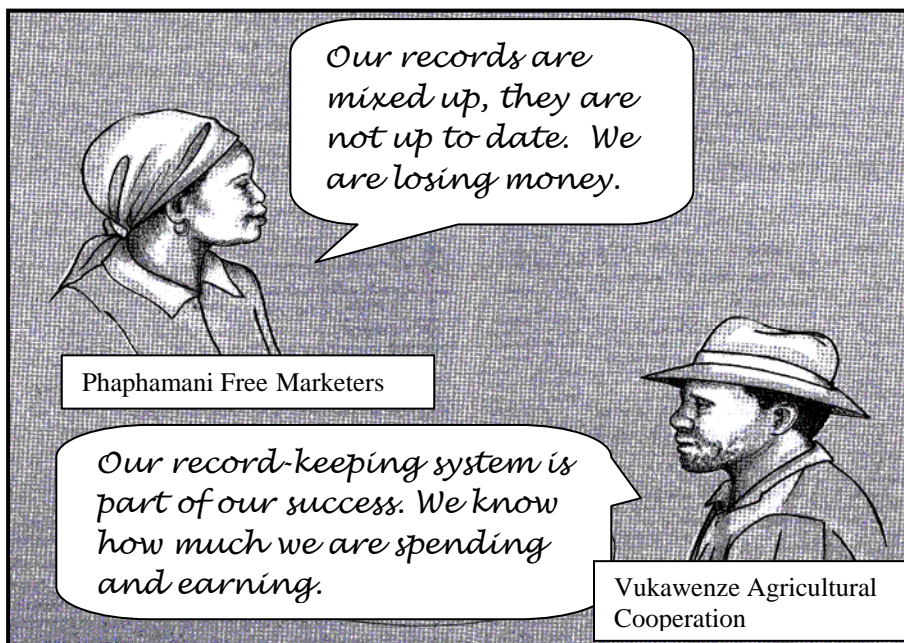
3.2.1 List THREE problems as indicated by the Human Rights Commission report mentioned above. (3)

3.2.2 State ONE malpractice experienced by children and women on farms. (1)

3.2.3 Suggest TWO solutions that would solve the issue of evictions on farms. (2)

- 3.2.4 Name an Act that addresses the health and safety issues of farm workers. (1)
- 3.2.5 Recommend legislation or an Act that both farm workers and managers can refer to in order to resolve their differences. (1)
- 3.2.6 Farm managers in South Africa are still faced with the challenge of an unskilled labour force. Suggest TWO ways to overcome this challenge. (2)

3.3 The following illustration represents two entrepreneurs:



- 3.3.1 Describe the THREE most important managerial characteristics of an entrepreneur. (3)
- 3.3.2 Identify the way that Phaphamani Free Marketers can overcome the challenge that they are facing. Explain your answer. (2)
- 3.3.3 Select a way that record keeping benefited Vukawenze Agricultural Cooperation, by referring to the illustration above. (1)
- 3.3.4 The entrepreneurial process is a process through which a new venture is created by an entrepreneur. In such a process the entrepreneur uses various equipment for technical support.
Name TWO types of technical support equipment that is utilised by the entrepreneur for effective communication with business partners. (2)
- 3.3.5 Name TWO important skills of a successful entrepreneur. (2)

3.4

CASE STUDY: LAND REFORM

A group of emerging farmers have been given land through the land redistribution programme of the Department of Land Affairs. The local climate favours the production of various crops, with many fruits and vegetables being grown. The farm has raised the hopes of many people of the local rural population regarding employment. These emerging farmers lack skills and experience in crop production, besides facing many other difficulties. They do not have start-up capital to run their newly acquired farming enterprise.

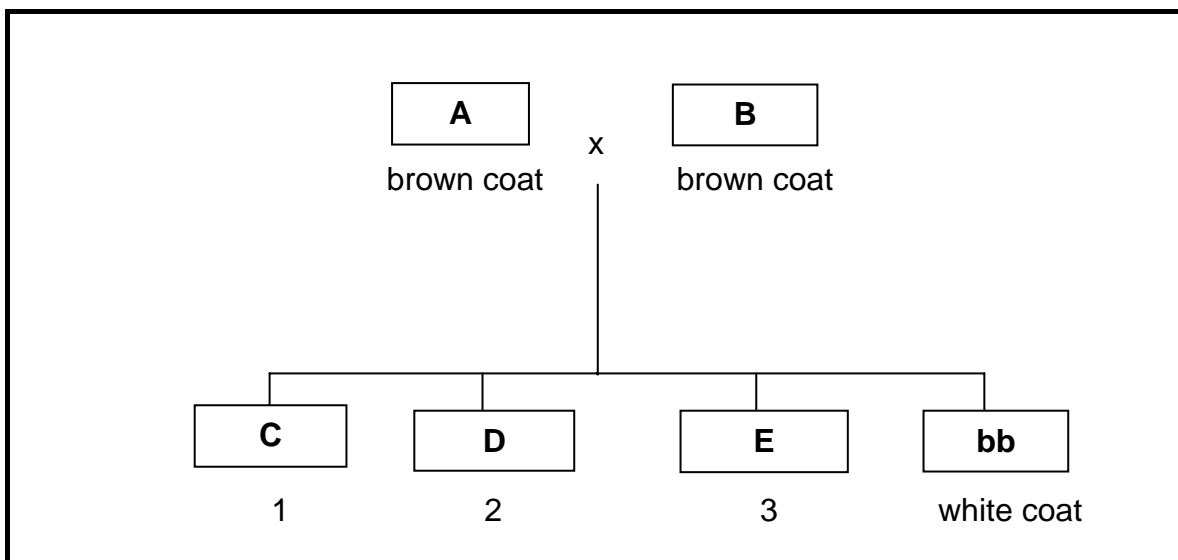
- 3.4.1 Identify TWO production factors from the case study that are available for the operation of the farm. (2)
- 3.4.2 Select TWO production factors from the case study that prevent the farm from being fully operational. (2)
- 3.4.3 Suggest a possible solution to these farmers that would assist them to overcome the problem on ONE of the production factors named in QUESTION 3.4.2. (1)

[35]

START THIS QUESTION ON A NEW PAGE.

QUESTION 4: BASIC AGRICULTURAL GENETICS



- 4.1 The gene for brown coat colour (B) in goats is dominant over that for white coat colour (b). Two brown-coated goats were mated.



- 4.1.1 Write down the genotypes of the parents indicated by A and B. (4)
- 4.1.2 Identify the phenotypes of the offspring in the F1 generation numbered 1, 2 and 3. (3)
- 4.1.3 Refer to the diagram and give the percentage of the F1 generation that is heterozygous for a brown coat colour. (2)

4.2

Different tomato cultivars can be distinguished, because they may be used for salads, sauces, jam, et cetera. This explains why tomato growers have different growth requirements. The pictures below show different cultivars that may be crossed to breed a new cultivar.

	
CULTIVAR A	CULTIVAR B
Has a bush-like growth with short shoots and round, very fleshy fruit with a long shelf life. This tomato cultivar grows fast and ripens quickly.	Has long shoots, well suited for trellising, with a round, long, fleshy fruit that has very little juice. All the tomatoes on the bush become ripe simultaneously.

- 4.2.1 When Cultivar A was crossed with Cultivar B, a very large and drastic improvement in yield was achieved. Give the genetic term that is responsible for this situation. (1)
- 4.2.2 State TWO genetic principles involved that are mainly responsible for the variation in this population. (2)
- 4.2.3 Differentiate between *external* and *internal variation*. (2)
- 4.2.4 Explain why hybridisation is labour-intensive in plant breeding. (1)
- 4.2.5 Give FOUR reasons for using the cultivars mentioned above in a breeding program. (4)

4.3 The following case study refers to the growing of cotton in KwaZulu-Natal:

Sonto Mabika cultivates the land that has been supporting her family for 45 years. She is among the 2 000 small-scale farmers in this semi-arid area in north-eastern Kwazulu-Natal who began growing GM cotton. This year she used genetically modified seed that sprouted cotton plants that contain an insecticide that reduces the need to spray against bollworm, cotton's number one pest. She will only have to spray her crops once or twice, instead of six times in a season. This results in savings on chemicals and labour, as well as higher yields.

According to Monsanto and its supporters in the biotechnology industry, the vast majority of these people choose to plant Bt cotton over conventional seed varieties.

- 4.3.1 Identify the main aim why Sonto used GM (genetically modified) cotton plants. (1)
- 4.3.2 Indicate TWO possible techniques used to modify plants genetically. (2)
- 4.3.3 Name TWO potential benefits of GM crops. (2)
- 4.3.4 Explain the potential negative impact of GM crops with regard to the following: (2)
- (a) TWO environmental impacts (2)
- (b) ONE health risk (1)
- (c) ONE ethical impact (1)

4.4 The table below indicates the values of heredity for sheep.

HEREDITARY CHARACTERISTIC				
	Birth weight	Post-weaning gain	Lean meat percentage	Fleece weight
Heritability (%)	33	60	35	17

- 4.4.1 Identify the characteristic that will have the slowest improvement in a breeding program. Explain your answer. (2)

- 4.4.2 Refer to the table on the previous page. Indicate the hereditary characteristic that each of the following farmers would focus on for the most effective improvement in their situations:
- (a) A farmer having a feedlot and measuring weight gain at regular intervals (1)
 - (b) A stud farmer who supplies young pure-bred animals to other commercial mutton farmers just after weaning (1)
 - (c) A wool farmer (1)
- 4.4.3 Name TWO other ways to improve the post-weaning gain (production output) in a flock of sheep. (2)
[35]
- TOTAL SECTION B: 105**
GRAND TOTAL: 150

EXAMINATION NUMBER: _____

CENTRE NUMBER: _____

SECTION A

QUESTION 1

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

	A ONLY	B ONLY	A AND B	NONE
1.2.1	A	B	C	D
1.2.2	A	B	C	D
1.2.3	A	B	C	D
1.2.4	A	B	C	D
1.2.5	A	B	C	D

(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