



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P2**

**FEBRUARY/MARCH 2012**

**MARKS: 150**

**TIME: 2½ hours**

**This question paper consists of 14 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 the questions carefully and make sure you answer 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. Non-programmable calculators may be used.
9. 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 allocated if more than one cross (X) appears for an answer.

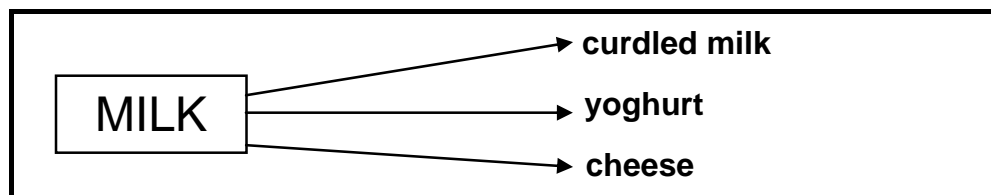
EXAMPLE:

1.1.11	<input checked="" type="checkbox"/>	A	B	C	D
--------	-------------------------------------	---	---	---	---

- 1.1.1 The ... indicates a condition where the quantity of a product required by consumers, is exactly equal to the quantity which producers wish to sell.

- A market niche
- B market equilibrium
- C market penetration
- D market value

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



- A grading.
  - B transport.
  - C standardisation.
  - D processing.
- 1.1.3 ONE of the following factors would influence the supply as well as the demand for a product:
- A The possibility of increasing the supply of products
  - B The range of products available
  - C The price of the products
  - D The attitude and values of consumers
- 1.1.4 The financial planning aspect on the farm, that ensures that money required to maintain production is available at all times, is called ...
- A income tax.
  - B insurance.
  - C cash flow.
  - D estate duty.

- 1.1.5 The characteristic of land, which is the reason for it being regarded as a safe investment, is its ...
- A susceptibility to the law of diminishing returns.
  - B variation in production potential.
  - C restrictedness.
  - D durability.
- 1.1.6 ONE of the following is NOT a form of capital:
- A Fixed capital
  - B Working capital
  - C Product capital
  - D Movable capital
- 1.1.7 A farmer can decrease the effect of the risk factors that will influence the form of income by ...
- A pawning capital items.
  - B repairing capital items.
  - C insuring capital items.
  - D selling capital items.
- 1.1.8 The flow of labourers from agriculture to industries may be because of the ...
- A low production output of the workers.
  - B willingness of the workers.
  - C size of the labour force squad.
  - D satisfaction of the workers.
- 1.1.9 ... cause an individual to die or become badly deformed.
- A Polygenes
  - B Recessive genes
  - C Lethal genes
  - D Dominant genes
- 1.1.10 The Dorper sheep breed was developed from the breeding of the Dorset Horn and the Blackhead Persian breeds. This is an example of a/an ... breeding system.
- A species-crossing
  - B upgrading
  - C cross-
  - D line-
- (10 x 2) (20)

1.2 Choose a description from COLUMN A that matches a concept/phrase 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	The place where producers and consumers meet	A	prepotency
1.2.2	The capital term represented by farm equipment and livestock	B	atavism
1.2.3	A situation where a heterozygous offspring shows a phenotype that is between the phenotypes of the homozygous parents	C	long-term capital
1.2.4	The condition where animals have a greater than usual ability to carry over their characteristics to their offspring	D	hybridization
1.2.5	Crossing between two homozygous individuals, differing in a pair of contrasting characteristics that produce heterozygous offspring in the F <sub>1</sub> -generation with a phenotype similar to the one parent	E	co-dominance
		F	short-term capital
		G	incomplete dominance
		H	medium-term capital
		I	complete dominance
		J	market

(5 x 2) (10)

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

- 1.3.1 A source of capital resulting from farming profits that have been allowed to accumulate in a bank
- 1.3.2 The management function that encourages farm workers to do their best at all times
- 1.3.3 The expression whereby one gene is controlled by another gene
- 1.3.4 An individual with two alleles of a pair of genes that are the same for a characteristic
- 1.3.5 A technique of changing the characteristics of an organism by inserting genes of another organism into its DNA

(5 x 2) (10)

1.4 Change the UNDERLINED word(s) in the following to make the statements 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 Competition-oriented pricing involves doing some research to find out what the consumer is prepared to pay for a particular product.

1.4.2 Packaging of the perishable agricultural produce is best achieved through controlled environment.

1.4.3 Fixed capital includes equipment like machinery on a farm.

1.4.4 Restitution is aimed at improving the security of tenure of people occupying rural and peri-urban land.

1.4.5 A large increase in the growth and productivity of the offspring produced by crossing genetically different parents is known as homeostasis. (5 x 1) (5)

**TOTAL SECTION A: 45**

**SECTION B**

Start this question on a NEW page.

**QUESTION 2: AGRICULTURAL MANAGEMENT**

- 2.1 The income statements of two farmers (FARMER A and FARMER B) are shown in the table below.

<b>FARMER A</b>		<b>FARMER B</b>	
<b>FARM INCOME</b>	<b>R</b>	<b>FARM INCOME</b>	<b>R</b>
Beef sale	100 000	Vegetables	120 000
Maize	80 000	Sheep	60 000
Lucerne	60 000		
<b>TOTAL INCOME</b>	<b>240 000</b>	<b>TOTAL INCOME</b>	<b>180 000</b>
<b>FARM EXPENDITURE</b>		<b>FARM EXPENDITURE</b>	
Electricity and water	8 000	Electricity and water	16 000
Marketing costs	16 000	Marketing costs	8 000
Fertiliser	14 000	Fertiliser	2 000
Seed	18 000	Seed	21 000
Livestock purchased	20 000	Livestock purchased	6 000
Herbicides	2 000	Herbicides	32 000
Labour	19 000	Labour	26 000
Transport	21 000	Transport	25 000
<b>TOTAL EXPENDITURES</b>	<b>118 000</b>	<b>TOTAL EXPENDITURES</b>	<b>136 000</b>
Profit/Loss		Profit/Loss	
<b>NET CASH INCOME</b>		<b>NET CASH INCOME</b>	

- 2.1.1 Indicate the farmer (FARMER A or FARMER B) who is more successful in terms of the net cash income. Show ALL the necessary calculations to support your answer. (5)
- 2.1.2 Identify the TWO major expense items in the business of FARMER B. (2)
- 2.1.3 Recommend an action that the farmer could take to make the business more profitable for each expense item identified in QUESTION 2.1.2. (4)

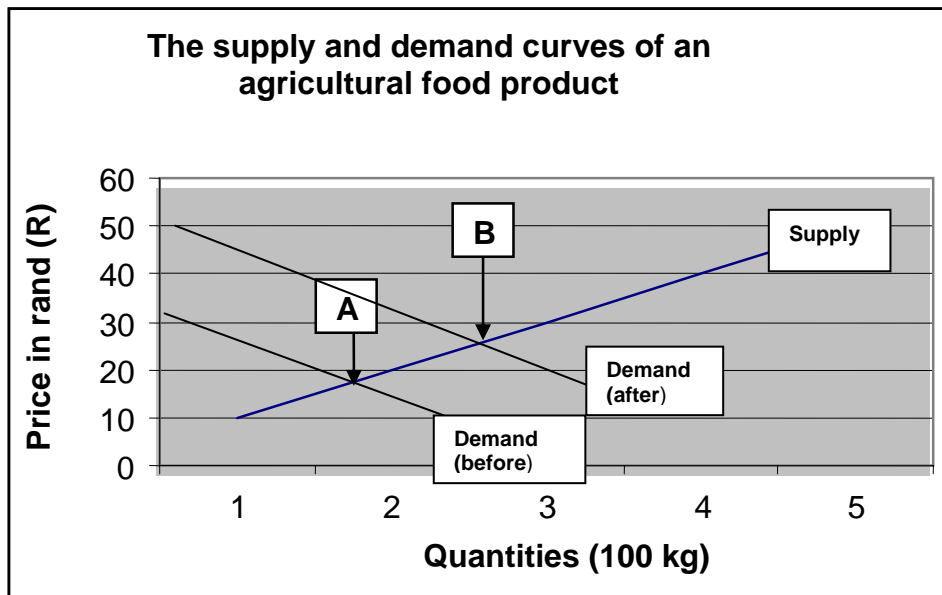
- 2.2 The table below indicates the number of bags of pumpkins that were sold at different prices at a local market per week.

<b>PRICE (R/BAG)</b>	<b>NUMBER (BAGS)</b>
R5	200
R10	150
R15	140
R20	120
R25	100
R30	50

- 2.2.1 Name a factor that determines the establishment of a price for pumpkins. (1)
- 2.2.2 Use the data in the table above to draw a line graph to represent the number of bags of pumpkins and price per week. (6)
- 2.2.3 Deduce from the line graph, when the greatest number of bags of pumpkins were bought. Give ONE reason to support your answer. (2)
- 2.3 A group of emerging bee-keepers started a project which is relatively new in their community. To ensure that their product is marketed effectively, they had to develop the market strategy. Briefly discuss this marketing strategy under the following headings:
- 2.3.1 Product (3)
- 2.3.2 Placement (2)



- 2.4 The graph below shows supply and demand for an agricultural food product over two periods (period before the 2010 Soccer World Cup and the period thereafter).



- 2.4.1 Indicate the effect of demand on the equilibrium price in the graph above. (2)
- 2.4.2 Discuss why the demand for an agricultural food product stays high even if the prices increase rapidly because of external factors. (2)
- 2.4.3 Explain the possible effect of a quota system on the supply of an agricultural food product to prevent over-production. (2)
- 2.5 The rains in January 2011 caused major flood damage to the long-term crops and cash crops lower down the Orange River. Proper flood management is essential to prevent damage in future.
- Suggest FOUR steps that farmers must take to reduce the impact of natural disasters on their farming enterprises. (4)

**[35]**

Start this question on a NEW page.

### QUESTION 3: PRODUCTION FACTORS AND MANAGEMENT

3.1

#### SCENARIO

A farmer never attended school and, as a result, could never have a formal job to support his family. This farmer started a small vegetable garden for his family with two casual labourers working in it. Community members wanted to buy vegetables from him. He wanted to help them, but he was unable to do so.

The farmer went to the Land Bank for a loan and advice on the effective use of money. Consequently, the farmer increased the size of his vegetable garden and bought vegetable seeds, tools, fertilisers and insecticides. At last the needs of the community were met.

- 3.1.1 Identify TWO examples of floating capital in the case study. (2)
- 3.1.2 Identify the type of labourers employed in this vegetable garden. Give a possible reason for employing this type of labourers. (2)
- 3.1.3 Indicate a source of capital mentioned in the case study. (1)
- 3.1.4 State TWO ways in which this farmer was able to increase the productivity of the land. (2)
- 3.1.5 The farmer can manage the business effectively if the objectives for successful management are followed. Name FOUR main components of successful management. (4)
- 3.1.6 Differentiate between *medium-term credits* and *short-term credits* as sources of capital for the proper management of the business. (4)

3.2

The farm manager should be able to plan activities in advance for labour productivity. The table below shows the work plan for raising sheep on a farm.

DUTY	MONTH	NUMBER OF WORKERS AND TIME
Herding	January to December	1 person every day
Lambing	May to June	1 person/day (limited period)
Dipping	February to December	2 people at regular intervals
Dosing	Every month	2 people at regular intervals
Shearing	October	1 person + shearers for 10 days

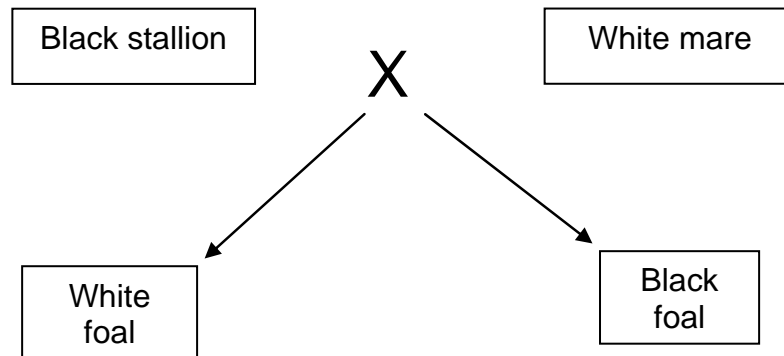
- 3.2.1 Identify TWO duties where permanent workers are needed. (2)
- 3.2.2 State FOUR ways by which the farm manager can improve the living conditions of the workers. (4)

- 3.2.3 Briefly explain the necessity of using seasonal workers for the shearing of sheep. (2)
- 3.2.4 Name TWO techniques that the sheep farmer can apply to manage climatic risks. (2)
- 3.3 Capital refers to the finances needed to own and operate a farm business. The farmer needs to keep financial records of assets in order to manage the capital of the farm business effectively.
- 3.3.1 Briefly explain the importance of keeping financial records for planning purposes. (2)
- 3.3.2 Describe TWO implications of overcapitalising a farm. (2)
- 3.3.3 When you apply for capital from a bank, your farm assets are used as collateral. Justify this statement. (2)
- 3.4 One of the problems of farm labour is lack of training.
- 3.4.1 Suggest TWO ways to the farmer to solve this problem. (2)
- 3.4.2 Recommend TWO ways of motivating farm workers so that they are not recruited by industries. (2)
- [35]**

Start this question on a NEW page.

**QUESTION 4: BASIC AGRICULTURAL GENETICS**

4.1 In some horse breeds black coat colour (**B**) is dominant over white (**b**). A white mare mates twice with the same black stallion. She produces a white foal on the first occasion and a black foal on the second occasion. The F<sub>1</sub>-generation shows the different possibilities of the offspring.



4.1.1 Use the letters **B** and **b**, as indicated above, and write down the genotype of the following horses involved in the above crossing:

- (a) White mare (1)
- (b) Black stallion (1)
- (c) White foal (1)
- (d) Black foal (1)

4.1.2 Indicate the percentage of the F<sub>1</sub>-generation which is the heterozygotic characteristic for black coat. (2)

4.2

**GENETICALLY MODIFIED MAIZE**

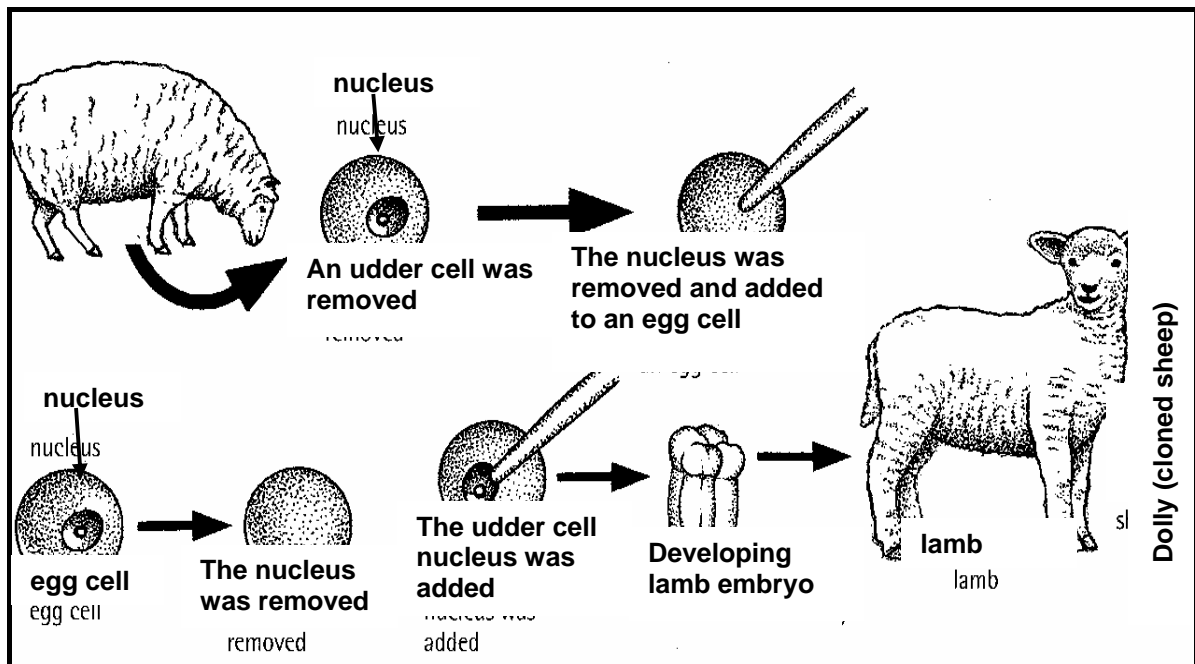
A recent development in the improvement of maize is the genetic modification thereof to make it resistant to the pest called maize stalk borer. A soil bacterium, called *Bacillus thuringiensis* (Bt), naturally makes a toxin (poison) that kills the maize stalk borer. Genetic engineering techniques are used to transfer the Bt toxin gene from the bacteria into the DNA of maize plants.

4.2.1 Briefly explain the technique using this bacterium to modify maize plants genetically. (4)

4.2.2 Identify THREE potential benefits of this GM crop. (3)

4.2.3 Explain the possibility of GM crops having a negative effect on the environment. (2)

4.3 The illustration below is on reproductive cloning.



4.3.1 Cloning is one of the asexual breeding methods. Motivate this statement. (2)

4.3.2 Use the illustration above to describe how the process of reproductive cloning takes place. (4)

4.3.3 Cloning is important to farmers. Support this statement. (2)

4.4 Breeding livestock involves selection that is used to produce specific breeds with desired characteristics. Name TWO desirable characteristics that a livestock breeder will look for when selecting livestock for breeding. (2)

4.5 Didekile Mfengu of Wesleyville in the Peddie area reported that his father liked Brahman cattle because they produce good, heavy and early weaners. The Nguni-type traditional Xhosa breed is too small and does not grow as fast as the Brahmans when they are kept in feedlots. The latter are taller and can bring in the height and weight that the Xhosa cattle do not have. The old and sick, deformed and non-fertile cows are sold to communities to be slaughtered for traditional ceremonies.

By 2005 he was mating all his Nguni-type Xhosa cows with Brahman bulls that were bought from commercial farmers and stud breeders. Richmond Nosenge (extension officer) noted that by breeding with hardy disease-resistant Brahmans, they could increase the size of the traditional cattle without losing their adaptability to the Eastern Cape environment.

[Adapted from *Farmers' Weekly*, 4 February 2011]

- 4.5.1 Identify the most suitable animal breeding system applied by Didekile Mfengu on his farm. Substantiate your answer. (3)
- 4.5.2 State THREE advantages of the system mentioned in QUESTION 4.5.1 above. (3)
- 4.5.3 The Brahman breed is regarded as superior to the Nguni breed. Motivate by giving THREE reasons. (3)
- 4.5.4 Name ONE traditional value of the cattle amongst the Xhosa community. (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**