



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P2

EXEMPLAR 2014

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO sections, namely SECTION A and SECTION B.
2. Answer ALL the questions in the ANSWER BOOK.
3. Start EACH question on a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Non-programmable calculators may be used.
6. 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 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 A.

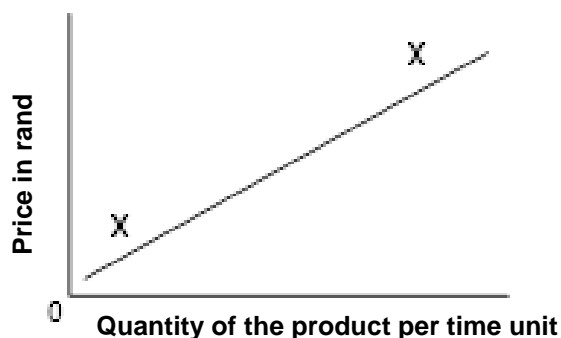
1.1.1 This action would support sustainable agricultural marketing:

- A Using packaging material from recycled material
- B Using flyers and printed brochures
- C Using specially shaped containers in plastic wrapping
- D Moving products as much as possible between different outlets

1.1.2 A written document that briefly outlines future actions on income and expenses of a farming business, based on projects, historic data, premises and experience:

- A Cash flow statement
- B Strategic income plan
- C Budget plan
- D Inventory

1.1.3 The straight line **X** in the graph below represents the ... of the product.



- A market equilibrium
 - B shortage
 - C demand
 - D supply
- 1.1.4 Which ONE of the following is NOT a function of agricultural marketing?

- A Storage
- B Processing
- C Competition
- D Transport

- 1.1.5 The greatest risk factor which the farm manager cannot control but has to consider when doing long-term planning is how to deal with challenges in ...
- A market prices.
 - B climate change.
 - C labour management.
 - D production costs.
- 1.1.6 Farm workers who only come to work on the farm for non-repetitive duties, like the erection of a farmstead, are known as ... labourers.
- A seasonal
 - B casual
 - C permanent
 - D fixed
- 1.1.7 The economic characteristic of a 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 the total ...
- A assets of the business minus the liabilities.
 - B liabilities of the business minus the assets.
 - C expenditure of the business minus the income.
 - D 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 Brahman bull is heterozygous (Bb) for a specific qualitative characteristic and is mated with a Brahman cow that is also heterozygous (Bb) for this characteristic. The expected phenotypic ratio for this characteristic 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 Choose a description from COLUMN B that matches a term in COLUMN A. Write only the letter (A–H) next to the question number (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 J.

COLUMN A	COLUMN B
1.2.1 Challenge when marketing agricultural produce	A the smallest chemical unit that has the ability to carry genetic information
1.2.2 Formulation of a vision and mission	B a strategic planning session which is a prerequisite for the implementation of a policy and for achievement of objectives
1.2.3 Genes	C incomplete dominance
1.2.4 Insect resistance	D complete dominance
1.2.5 Crossing of plants with red and white flowers and their offspring produce only plants with red flowers	E perishability of produce
	F most common reason for the genetic modification of crops
	G the structure that is modified during the process of genetic engineering
	H control is an important factor in management

(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) in the ANSWER BOOK.

- 1.3.1 The portion of the final price that is taken up by costs involved in selling the produce
- 1.3.2 The process of attracting public attention to a specific agricultural product or business through various forms of communication
- 1.3.3 The comprehensive activity involving the combination and coordination of human, physical and financial resources for agricultural production
- 1.3.4 The crossing of two homozygous individuals that results in heterozygous offspring showing the characteristics of the one parent
- 1.3.5 The transfer of a specific gene of one organism into the cell of another organism in order to obtain a desired characteristic (5 x 2)

(10)

1.4 Change the UNDERLINED WORD(S) in each of the following statements to make them TRUE. Write only the answer next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 The total quantity of a commodity that a producer wishes to sell is called the demand for that product.

1.4.2 The portion of the total available capital of the farming enterprise which is supplied by other persons or financial institutions is known as own capital.

1.4.3 Industrialisation is the term used for the replacement of farm labour by capital investment on the farm.

1.4.4 Cross-breeding leads to a gradual decrease in performance from generation to generation.

1.4.5 A micro-injection is an apparatus used to fire tiny particles of genes into a piece of the plant tissue.

(5 x 1) (5)

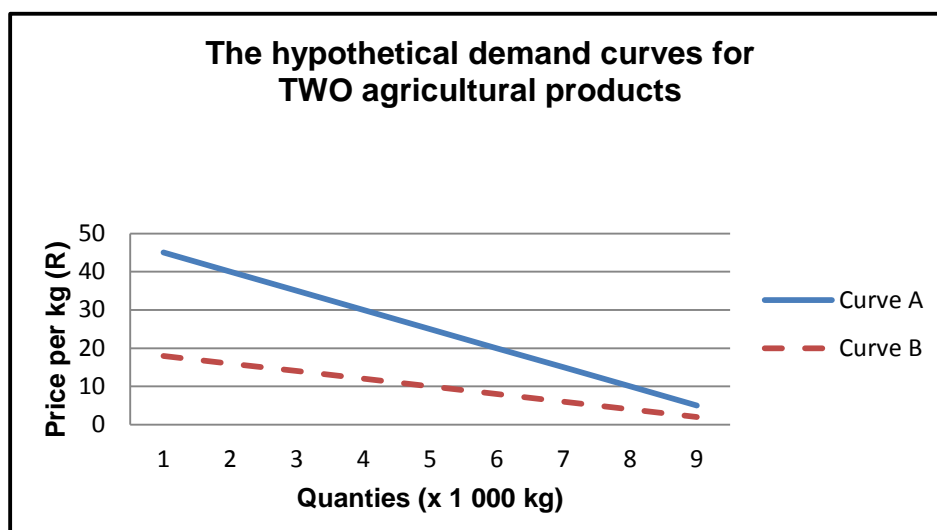
TOTAL SECTION A: 45

SECTION B**QUESTION 2: AGRICULTURAL MANAGEMENT**

Start this question on a NEW page.

- 2.1 Farmer A intended to provide pork to a rural community with strong cultural beliefs. During a marketing period of a month, very small quantities of pork were sold, to Farmer A's surprise. Farmer B sold goats and was satisfied with his sales during the same month.

The demand curves below represent the prices of pork and goat's meat at different quantities during this marketing period.



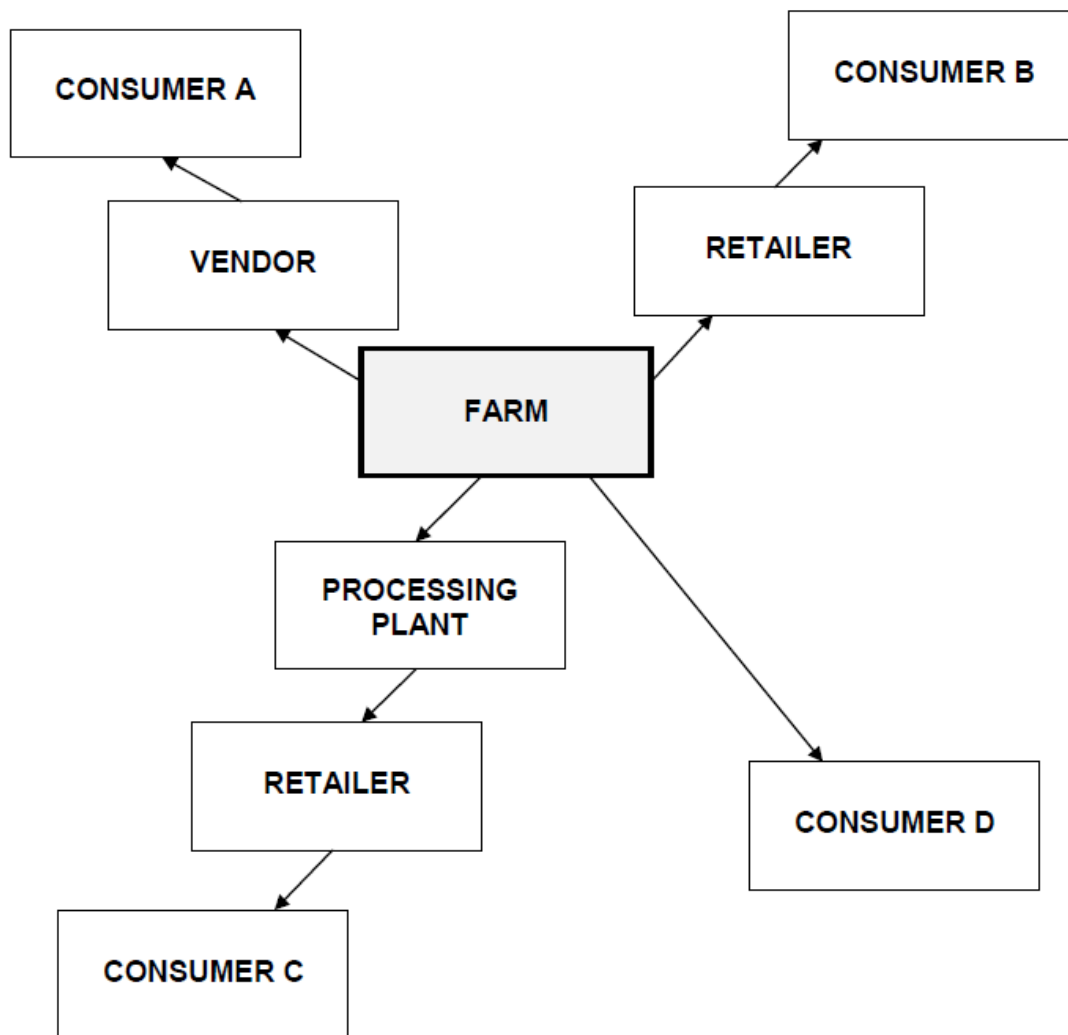
- 2.1.1 Define the term *demand*. (2)
- 2.1.2 Identify which curve (A or B) represents the pork and goat's meat respectively by using the data supplied above. (2)
- 2.1.3 Explain the main reason why Farmer B was satisfied by referring to the data. (2)
- 2.1.4 Determine the price for the product represented by curve A at a quantity of 2 000 kg. (2)
- 2.1.5 Calculate the quantity of the product represented by curve B at a price of R10,00. (2)
- 2.1.6 Give a possible reason why the community was not prepared to pay higher prices for the product represented by curve B. (2)

- 2.2 The table below indicates some of the income and expenses on a small fruit farm for July.

EXPENSES			INCOME		
DATE	ITEM BOUGHT	COST (R)	DATE	ITEM SOLD	COST (R)
02/07	Transport of products	80,00	04/07	Figs	280,00
06/07	4 x 50 kg farm manure	320,00	06/07	Figs	294,00
06/07	Packaging materials	40,00	06/07	Figs	280,00
06/07	Pesticides	100,00	07/07	Figs	308,00
06/07	Loan repayment (ABSA)	125,00	08/07	Cherries	301,00
12/07	Transport of products	80,00	10/07	Cherries	280,00
15/07	Free fruit for workers	28,00	11/07	Cherries for home	14,00
24/07	Bonus payments to workers	320,00	26/07	Cherries	301,00
TOTAL		1 093,00	TOTAL		2 058,00

- 2.2.1 Give TWO reasons why it is important for a farm manager to keep financial records. (2)
- 2.2.2 Use a formula to calculate the profit the farmer made for the month, based on the data given. (4)
- 2.2.3 State ONE incentive that the farmer gave to the farm workers to motivate them. (1)
- 2.2.4 From the data given, state TWO ways in which this farmer generated farm capital. (2)
- 2.3 The free marketing system is commonly practised in the agricultural sector in South Africa rather than the controlled marketing system of the past.
- 2.3.1 Compare TWO unique features of the pool marketing system with those of the free marketing system. (4)
- 2.3.2 State THREE advantages of the free marketing system. (3)

- 2.4 The schematic representation below illustrates the route followed by a product from a farm to different consumers.



- 2.4.1 Name the marketing aspect illustrated in the schematic representation above. (1)
- 2.4.2 Indicate the consumer (**A**, **B**, **C** or **D**) who will pay the most for the product that originated on the farm. Motivate your answer. (3)
- 2.4.3 Choose the most appropriate consumer in the schematic representation above that matches each of the following descriptions:
- (a) A person who buys fresh agricultural products from a person selling small quantities at the train station (1)
 - (b) A person stopping at the farm to buy fresh products from the farmer (1)
 - (c) A person who buys processed products from a large retail grocery store (1)

[35]

QUESTION 3: PRODUCTION FACTORS AND MANAGEMENT

Start this question on a NEW page.

3.1 Read the scenario below and answer the questions that follow.

INSECTS – A FUTURE PROTEIN SOURCE

A group of subsistence farmers in the remote area of the country realised that some insect species could be processed into a viable and healthy protein source. The farmers found a ready market. They then formed a commercial entity with the assistance of the Development Bank of Southern Africa (DBSA) to develop this possibility.

Researchers from a nearby university visited these farmers and trained them in production, harvesting and processing techniques. These farmers, known as the IP (Insect Producers) Cooperative signed a contract with an animal feed company that wanted to use insect protein in their feed formulations.

The IP Cooperative plans to sort out production-related challenges during the first two years, after which they will diversify to include protein sources for human consumption to their product range. The Agricultural Research Council was also invited to give them guidance in the development of this unique business venture. More follow-up workshops are planned for later.

3.1.1 These farmers are seen as entrepreneurs.

State TWO characteristics in the scenario above that would define these farmers as entrepreneurs.

(2)

3.1.2 Explain how the farmers in the scenario will sustain the planned venture.

(1)

3.1.3 Define the concept *diversification*.

(2)

3.1.4 Name the source of capital for the planned venture.

(1)

3.1.5 Name a method of marketing that these farmers used to market their product. Motivate your answer.

(2)

3.2 The photograph below represents a commercial farming operation:



- 3.2.1 The farming operation in the photograph above is described as a commercial agricultural operation. Motivate this statement by giving a reason visible from the photograph. (2)
- 3.2.2 Name an item or action visible in the photograph that is linked to the following production factors:
- (a) Labour (1)
 - (b) Capital (1)
 - (c) Land (1)
- 3.2.3 Describe TWO aspects visible in the photograph that indicate that good management practices are followed. (2)
- 3.2.4 Name the economic characteristic of land that is linked to the challenges below that the commercial farmer in the photograph is facing:
- (a) A road is being planned through the middle of the wheat field. (1)
 - (b) More units of manure and fertiliser do not further increase the proportional yield on the farm. (1)
 - (c) This farm is in the market as the farmer is getting older, wants to retire and live off his interest. (1)
 - (d) This farm has been productive for three generations and production potential has been sustained. (1)

3.2.5 A possible buyer is interested in this farm.

Write down the following with regard to this transaction:

- (a) The type and duration of credit needed to buy this farm (1)
- (b) A possible source of this type of credit (1)
- (c) The aspect related to credit that makes this loan expensive (1)

3.3 The picture below represents a scene during the 2012 labour unrest at De Doorns in the Western Cape.



- 3.3.1 Name the type of temporary labour that was mainly involved in the labour action above. (1)
- 3.3.2 State the TWO main concerns that gave rise to this farmworker strike action. (2)
- 3.3.3 Name TWO types of disruptions that were associated with the labour unrest that is visible in the picture above. (2)
- 3.3.4 Calculate the following, using the data above:
 - (a) The percentage increase in wages demanded by the farm workers (2)
 - (b) The value of a USD (American dollar) in terms of ZAR (South African rand) during the strike action (2)
- 3.3.5 State THREE negative economic impacts of such a labour action. (3)
- 3.3.6 Name the document that is drawn up between the farm owner and the farm labourer to protect both parties during the employment period. (1)

(1)
[35]

QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

- 4.1 A brown male horse (stallion) is mated with a white female horse (mare) on two consecutive breeding seasons. Brown coat colour (B) is the dominant characteristic and white coat colour (b) is the recessive characteristic.

The mare first produces a brown foal and then a white foal.

- 4.1.1 Indicate the phenotype of the parents as described in the data above. (2)
- 4.1.2 Write down the genotypes of the parents. (2)
- 4.1.3 Name the type of dominance demonstrated in this crossing. (1)
- 4.1.4 Write down the genotypes of the offspring born in the respective breeding seasons. (2)
- 4.1.5 Indicate the possible genotypes of the first crossing by means of a Punnett square. (3)
- 4.1.6 Write down the phenotypic segregation pattern from the first crossing mentioned in QUESTION 4.1.5. (2)

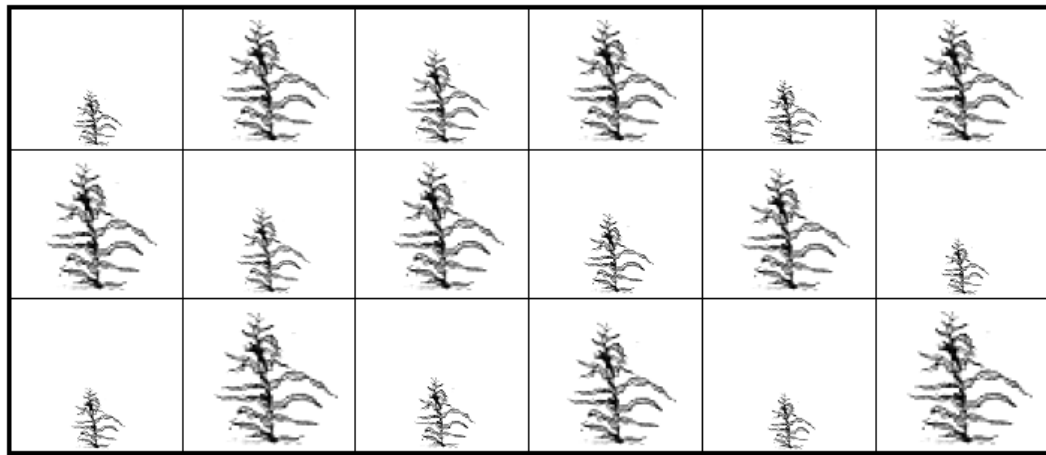
- 4.2 In a certain herbal plant species, a mint fragrance released by glands in the leaves is dominant over plants where no fragrance is released. A plant that is heterozygous with a mint fragrance is crossed with a plant with no mint fragrance.

Use the following key to represent the genotypes:

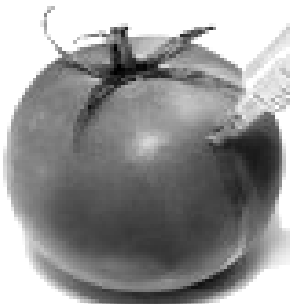

A = Mint fragrance
a = No mint fragrance

- 4.2.1 Use a schematic representation with labels to indicate the crossing of these two plants up to the F₁-generation. Write down the phenotypes next to the genotypes, where necessary. Indicate the F₁-generation by means of a Punnett square. (5)
- 4.2.2 Calculate the percentage of the F₁-generation that will have a mint fragrance on their leaves. (1)
- 4.2.3 The plant with a mint fragrance on its leaves in the F₁-generation is self-pollinated and 64 new plants are reproduced from it. Indicate the number of plants with no mint fragrance on their leaves. (2)

- 4.3 The diagram below represents the offspring produced from a crossing of maize plants.



- 4.3.1 Describe the genetic phenomena illustrated in the diagram above. (1)
- 4.3.2 Compare the number of small, medium and large plants in this offspring using a simple table. (4)
- 4.3.3 Briefly explain the main contribution of the phenomena mentioned in QUESTION 4.3.1 for crop breeding. (1)
- 4.4 The diagrams below represent tomatoes. Genes are inserted into the DNA of one of the tomatoes to let it stay firm and fresh for a long period on shop shelves.

A **B**

GENETICALLY MODIFIED ORGANISMS

An agribusiness advertises: 'Buy our industrial tomatoes – now genetically flavoured, firmer and bigger!' By artificially re-engineering the DNA structure of the plant, the geneticists can bypass the mutated gene and switch on some of the flavour genes. But do we really want to eat genetically engineered tomatoes?

- 4.4.1 Write down the letter (**A** or **B**) representing the GM tomato. (1)
- 4.4.2 Give TWO reasons for the answer to QUESTION 4.4.1. (2)

4.4.3	State TWO advantages of GM tomatoes for housewives.	(2)
4.4.4	State TWO advantages of GM tomatoes for the agribusiness.	(2)
4.4.5	Briefly describe TWO potential risks of GM crops.	(2)
		[35]
TOTAL SECTION B:		105
GRAND TOTAL:		150