



Education and Sport Development

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NORTH WEST PROVINCE

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURAL SCIENCES P2

SEPTEMBER 2019

MARKS: 150

TIME: 2½ hours

This question paper consists of 12 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. You may use a non-programmable calculator.
6. Show ALL calculations, including formulae, where applicable.
7. 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 numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g 1.1.11 A.
- 1.1.1 ONE of the following aspects is NOT normally part of a business plan.
- A Soil surveyance detail
 - B Marketing plan
 - C Farm budget
 - D Details of employees
- 1.1.2 The ... indicates a state where the quantity of a product required by consumers is exactly equal to the quantity that producers wish to sell.
- A market value
 - B market segmentation
 - C market chain
 - D market equilibrium
- 1.1.3 ... cause an individual to die or become badly deformed.
- A Polygenes
 - B Lethal genes
 - C Dominant genes
 - D Recessive genes
- 1.1.4 ONE of the following is NOT an advantage of farm gate marketing:
- A Prices are generally lower than at retail outlets
 - B Produce is generally very fresh
 - C The product can stay longer on the shelf if the buyers do not visit the farm shortly after harvest
 - D Saves on transport costs
- 1.1.5 The document that provides the expected income and expenditure of the farm for a given period:
- A Income Statement
 - B Budget
 - C Cash Flow Statement
 - D Insurance Policy

1.1.6 A pattern of inheritance in which both alleles are expressed equally in heterozygous individuals:

- A Complete dominance
- B Epistasis
- C Polygenic inheritance
- D Co-dominance

1.1.7 Entering into future contracts to ensure a secure market and price as part of strategic risk management is...

- A overcapitalisation.
- B competition.
- C hedging.
- D diversification.

1.1.8 All human and physical effort used in the production process:

- A Labour
- B Capital
- C Management
- D Production

1.1.9 If two animals are heterozygous for a particular characteristic and are mated, the ratio of the phenotypes of the F₁-generation will be $\frac{1}{2}$

- A 2 : 3
- B 4 : 1
- C 3 : 1
- D 1 : 2

1.1.10 The components of a supply chain are:

- (i) purchasing
- (ii) manufacturing
- (iii) distribution
- (iv) sales

Choose the CORRECT combination:

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

(10 x 2) (20)

- 1.2 Choose a term/phrase from COLUMN B that matches a description in COLUMN A. Write only the letter (A H) next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, e.g. 1.2.6 K.

COLUMN A		COLUMN B
1.2.1	The type of labour that works during peak periods such as harvesting time	A demand
1.2.2	A solution used to reduce the risk of marketing agricultural products	B electroporation
1.2.3	The quantity of the product which can be purchased at a given time by consumers at all possible alternative prices	C Employment Equity Act
1.2.4	The legislation that governs employee relations at the workplace and their right to be members of associations including trade unions	D seasonal worker
1.2.5	The use of an electric shock in a DNA containing solution to allow new DNA to be incorporated into cells	E Labour Relations Act
		F insurance
		G permanent worker
		H supply

(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 numbers (1.3.1 to 1.3.5) in the ANSWER BOOK.

1.3.1 Transformation of agricultural produce into a different product

1.3.2 The process of choosing individuals with desirable characteristics in order to breed offspring that may inherit their characteristics

1.3.3 A genetic cross between parents that differ by alleles they have for one particular characteristic

1.3.4 The type of credit used by a farmer to buy fertilisers

1.3.5 The reappearance of an ancestral characteristic that have been absent in a herd or breed for a number of generations

(5 x 2) (10)

1.4 Change the UNDERLINED word(s) in EACH of the following statements to make it TRUE. Write only the answer next to the question numbers (1.4.1 to 1.4.5) in the ANSWER BOOK.

1.4.1 Threadlike structures that contain genetic information in DNA are called locus.

1.4.2 Species crossing is the repeated mating of a thoroughbred male with female animals of another breed that are of inferior quality.

1.4.3 Homozygous are different forms of a gene.

1.4.4 Supervision refers to the activity involving the combination and co-ordination of human, physical and financial resources.

1.4.5 Selling is the process of transporting goods along the marketing chain.
(5 x 1) (5)

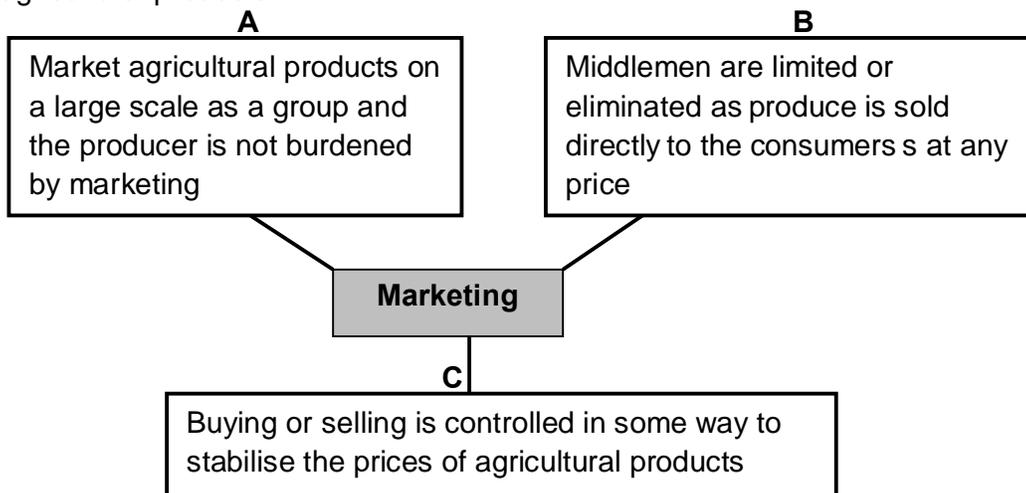
TOTAL SECTION A: 45

SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

Start this question on a NEW page.

2.1 The schematic representation below shows different systems of marketing agricultural products.



2.1.1 Identify the systems of marketing represented by **A**, **B** and **C**. (3)

2.1.2 State TWO advantages of marketing labelled **B** to the farmer. (2)

2.2 Distinguish between *farm gate* and *internet marketing* channels. (4)

- 2.3 Name the stage in the entrepreneurial process that is reflected by EACH of the following descriptions.
- 2.3.1 The process of surveying the market, looking at the available skills and resources (1)
- 2.3.2 Prepare a business plan and an operational plan to determine which resources are needed to launch the business (1)
- 2.3.3 Consolidate the resources and submit your business plan to a financial institution to secure start-up capital (1)

2.4 A group of youth planned to start a business, using the communal land of 380 ha, but they did not have any specific skills nor capital, the area had poor weather conditions.

There was however a flourishing project nearby in the neighbouring village. They became motivated and inspired and started to plan farming with cattle and selling beef to the local community. They also intended to grow vegetables to supply the local supermarket. They would utilise the services of the agricultural extension officer for advice.

Use a SWOT analysis and identify the following from the scenario above:

- 2.4.1 TWO strengths (2)
- 2.4.2 ONE weakness (1)
- 2.4.3 ONE opportunity (1)
- 2.4.4 TWO threats (2)
- 2.5 State TWO ways to improve and streamline the agri-business chain. (2)
- 2.6 Below is a list of legislation for effective marketing of agricultural products

- Meat Safety Act (No. 40 of 2000);
- Consumer Protection Act (No. 68 of 2008);
- Perishable Product Export Control Act (No. 9 of 1983);
- Agricultural Product Standards Act (No.119 of 1990)

Link the legislation with the roles below. Write only the legislation next to the Question numbers (2.6.1 – 2.6.3)

- 2.6.1 Controls the sale and export of certain agricultural products (1)
- 2.6.2 Sets and maintains national standards at abattoirs and regulates the import and export of meat (1)
- 2.6.3 Promote the fair and sustainable access to products and sources (1)

- 2.7 Distinguish between mass and niche marketing. (4)
- 2.8 The table below shows the price, supply and demand of bags of oranges over a five-week period.

WEEKS	PRICE (R/bag)	QUANTITY(bag)	
		SUPPLY	DEMAND
1	10	5	25
2	15	10	20
3	20	15	15
4	25	20	10
5	30	25	5

- 2.8.1 Draw a line graph to compare the quantity of oranges supplied and demanded over the 5-week period. (6)
- 2.8.2 Explain why there was a higher demand for oranges in Week 1 than in Week 5. (2)
- [35]**

QUESTION 3: PRODUCTION FACTORS

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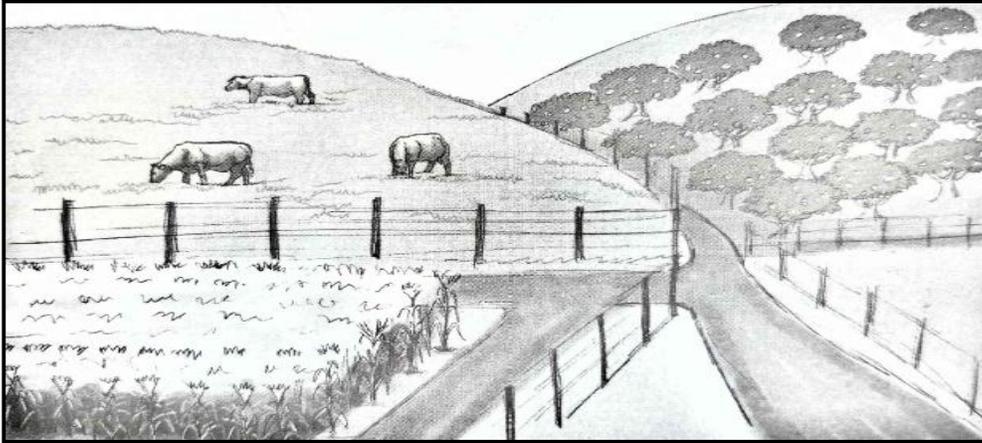
- 3.1 Give THREE functions of land as a production factor. (3)
- 3.2 Different methods to improve the productivity of land are indicated below:

A Restoring land potential
B Consolidation of uneconomic farm units
C Intercropping

Write down ONLY the letter of the methods (A. C) that best suits each of the descriptions below:

- 3.2.1 Beans planted in the space between rows of maize (1)
- 3.2.2 Halting soil erosion by constructing contours (1)
- 3.2.3 Small units are combined and precision farming techniques are practiced (1)
- 3.3 State the legislation that regulates EACH of the following labour issues:
- 3.3.1 Injury and damage caused when protective clothing is not used (1)
- 3.3.2 Protects those employees who are disabled or killed as the result of a workplace accident (1)
- 3.3.3 Provides financing for the training of workers (1)

- 3.4 The picture below shows a farm with different operations that are managed successfully.



- 3.4.1 Define the term *strategic risk management*. (2)
- 3.4.2 Identify the risk management strategy illustrated in the picture above. (2)
- 3.4.3 Justify the answer to QUESTION 3.4.2. (2)
- 3.4.4 Name ONE management skill that will enable the manager to effect the strategy in QUESTION 3.4.2 with success. (1)
- 3.4.5 Give TWO sources of risks that can directly affect the operations of the farming enterprise above. (2)
- 3.5 Labour is crucial in agriculture.
- 3.5.1 Give FOUR impacts of HIV/AIDS on the productivity of the labour force. (4)
- 3.5.2 Explain how a farmer can increase the productivity of farm labourers with reference to the following:
- (a) Educational levels (2)
 - (b) Working conditions (2)

3.6 The table below indicates the income and expenses on a farm:

INCOME/SALES	RAND
Maize	36 000
Beef	90 000
Dry beans	16 000
Poultry	5 000
EXPENDITURE	RAND
Insurance and licences	10 560
Electricity and water	10 000
Bank charges	1 200
Labour costs	55 000
Rent	4 000
Herbicides and pesticides	14 000
Other crop costs	297

- 3.6.1 Identify the type of record shown in the table above. (2)
- 3.6.2 Use a formula to calculate the net profit of this farm. (3)
- 3.7 Differentiate between *fixed* costs and *variable* costs. (4)
- [35]**

QUESTION 4: BASIC AGRICULTURAL GENETICS

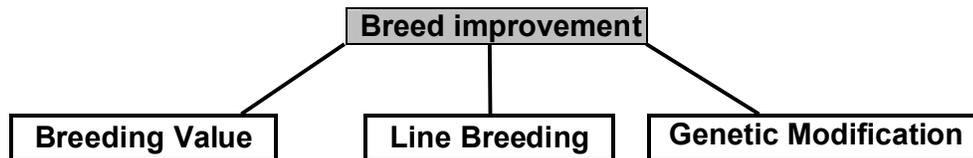
Start this question on a NEW page.

- 4.1 A farmer cross-pollinated a heterozygous pea plant with yellow seed (G) and a pure-bred pea plant with green seed (g).
- 4.1.1 Indicate the genotype of EACH parent for the first generation. (2)
- 4.1.2 Use the Punnet square method to determine the possible genotype in the offspring of the first crossing. (3)
- 4.1.3 Name the type of dominance shown by the crossing in QUESTION 4.1.2. (1)
- 4.1.4 Calculate the percentage of heterozygous offspring in the F₁-generation. (2)
- 4.2 Explain Mendel's law of independent assortment. (2)
- 4.3 Epistasis and prepotency play an important role in inheritance.
- 4.3.1 Explain the role of the epistatic gene in prepotency. (3)
- 4.3.2 Name an example of prepotency. (1)

- 4.4 Choose ONE cause of variation from the list below that matches the following descriptions. Write only the word/term next to the question numbers (4.4.1 4.4.3) in the ANSWER BOOK.

mutation; crossing-over; deletion; inversion

- 4.4.1 One or more nucleotide bases are removed from the gene sequence (1)
- 4.4.2 Exchange of portions of chromatids of homologous chromosomes during Prophase I of meiosis, give rise to new gene combinations (1)
- 4.4.3 A sudden change in the genetic material of a cell (1)
- 4.5 Breeding for improvement. Choose from the flow chart the breeding method/ technique that is addressed by the statements below:



- 4.5.1 Name the method that uses on-breeding records without any technology. (1)
- 4.5.2 A method which becomes more reliable with more off-springs of better quality an animal produces. (2)
- 4.5.3 It incorporates genes from *Bacillus thuringensis*. (2)
- 4.5.4 Give THREE socio-economic benefits of the crops produced by the method in QUESTION 4.5.3. (3)
- 4.5.5 Name TWO potential environmental risks posed by genetically modified plants. (2)

- 4.6 The table below indicates heritability percentage of different characteristics in sheep.

	BIRTH WEIGHT	POST-WEANING WEIGHT	FLEECE WEIGHT
Heritability (%)	60	35	50

- 4.6.1 Give the value of heritability of the fleece weight for the lambs. (1)
- 4.6.2 Give the primary factor influence birth weight? (1)
- 4.6.3 Suggest TWO reasons why the post-weaning weight in the table above would not be recommended for breeding purposes (2)
- 4.6.4 Explain the difference between *heritability* and *biometrics*. (4)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150