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EXAMINATION	NATIONAL SENIOR CERTIFICATE
GRADE	12
DATE	NOVEMBER 2024
SUBJECT	AGRICULTURAL SCIENCES
PAPER	2
MARK TOTAL	150
DURATION (HOURS)	2½
NUMBER OF PAGES	15

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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 make sure you answer only what is asked.
6. Number the answers according to the numbering system used in this question paper.
7. Staple your answer sheet for **SECTION A (QUESTION 1)** inside your **ANSWER BOOK**.
8. Write neatly and legibly in **BLUE** pen only.
9. A non-programmable calculator can be used.
10. Show **ALL** calculations.

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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**) on the correct letter next to the question number (1.1.1 – 1.1.10) in the attached **ANSWER SHEET**, for example:

1.1.1	A	~~B~~	C	D

1.1.1 … occurs at the point where the market supply and the market demand curves meet.

A Market development

B Surplus

C Market equilibrium

D Shortage (2)

1.1.2 The quantity of a product which can be purchased by consumers at all possible alternative prices.

A Supply

B Capital

C Equilibrium

D Demand (2)

1.1.3 An example of a processing function is....

A protection.

B canning.

C refrigeration.

D packing in containers. (2)

1.1.4 The main ways to streamline and improve agri-business plans are ...

i) collecting information
ii) selecting a marketing chain
iii) selling products
iv) mapping the marketing chain

Choose the CORRECT combination:

A (i), (ii) and (iv)

B (i), (ii), (iii) and (iv)

C (i), (ii) and (iii)

D (ii), (iii) and (iv) (2)

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1.1.5 The characteristic of soil which is the reason for it being regarded as a safe investment.

A Susceptibility to the law of diminishing returns

B Variation in production potential

C Location

D Durability (2)

1.1.6 The "quality of labour" refers to ONE of the following:

A Satisfaction of the workers

B Willingness of the workers

C Size of the labour force

D Productivity of the workers (2)

1.1.7 It refers to the list of capital goods on a farm.

A Inventory

B Balance sheet

C Trial balance

D Minutes (2)

1.1.8 Examples of risk-sharing strategies are:

i) insuring against risk
ii) diversification
iii) specialisation
iv) mechanisation

Choose the CORRECT combination:

A (i), (ii) and (iv)

B (i) only

C (ii), (iii) and (iv)

D (i) and (ii) (2)

1.1.9 The smallest hereditary factor found in the nucleus of living cells is called …

A RNA

B chromatids

C genes

D chromosomes (2)

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1.1.10 ... is a selection method that focuses on the quality of the ancestors rather than on the individual.

A Pedigree selection

B Artificial selection

C Natural selection

D Mass selection (2)

(10 x 2) **(20)**

1.2 Choose a description from **COLUMN B** that matches a term/phrase in **COLUMN A**. Write only the letter (A – J) next to the question number (1.2.1 to 1.2.5) in the attached **ANSWER SHEET**, for example 1.2.6 L.

COLUMN A		COLUMN B	
1.2.1	Cooperative marketing	A	Combination of uneconomical units
1.2.2	Grading	B	The marketing of agricultural products through the pool system
1.2.3	Saving	C	Money received for products
1.2.4	Consolidation	D	An internal source of farming capital
1.2.5	Meiosis	E	Amount paid for money borrowed
		F	The actual sorting process of products according to laid down standard specifications
		G	The process by which gametes are formed
		H	The process of moving the product from the farm to the consumer
		I	Multiplying of cellular material
		J	Complete list of assets on a farm

(5 × 2) **(10)**

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1.3 Give the **CORRECT AGRICULTURAL TERM** for each of the following descriptions. Write only the word/term next to the question numbers (1.3.1 – 1.3.5) in the attached **ANSWER SHEET**, for example, 1.3.6 Bile.

1.3.1 The highest price for products which are sold on controlled markets.

1.3.2 The rapid switch over to mechanisation leads to a specific social problem.

1.3.3 The passing on of traits from generation to generation.

1.3.4 The breeding method where both parents are related to a particular ancestor.

1.3.5 The attachment of a second copy of an undesirable gene the wrong way around to make it inactive.

(5 x 2) **(10)**

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

1.4.1 <u>Selling</u> is a consumer driven approach in which consumer satisfaction is important.

1.4.2 <u>Assets</u> refer to money and items with monetary value that can be used to produce other goods and generate profit.

1.4.3 <u>Sex linkage</u> is the inheritance pattern of a characteristic controlled by two or more genes.

1.4.4 Genetic engineering utilises a process where the genetic material is <u>selected</u>.

1.4.5 An <u>oncogene</u> is a physical or chemical agent that permanently changes genetic material.

(5 x 1) **(5)**

TOTAL SECTION A: [45]

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SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT

Start this question on a **NEW** page

2.1

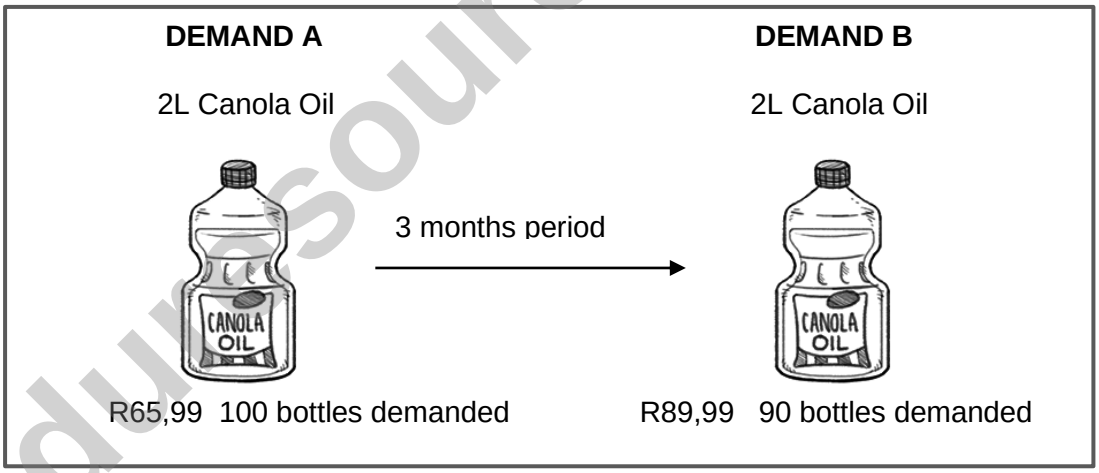
Involves the design of a product acceptable to consumers Obtaining orders from customers Concerned with the sale of goods already produced It is consumer orientated

2.1.1 From the above scenario identify the phrases that match the following:

(a) TWO characteristics of selling (2)
(b) TWO characteristics of marketing (2)

2.1.2 State FOUR advantages of processing. (4)

2.2 The diagram below shows the demand for canola oil at different prices within a period of three months.



2.2.1 Identify the marketing concept illustrated by demand **A** and **B** above. (1)

2.2.2 Give a reason for the answer to QUESTION 2.2.1. (1)

2.2.3 Explain the reason why consumers responded in such a way to the price change over three months. (2)

2.2.4 Suggest the factor that could have led to the difference in the number of bottles demanded. (1)

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2.3 The following is a list of activities that are related to the production and marketing of agricultural products.

- Sales to consumers
- Planning for production
- Soil preparation and planting
- Storage
- Grading
- Distribution

2.3.1 Select and arrange in the correct order any THREE activities in the list above that are applied in an agri-business chain. (3)

2.3.2 Identify TWO problems of marketing agricultural products that are related to the distribution process. (2)

2.3.3 Indicate an activity in the list above related to the standardisation of agricultural products. (1)

2.4 The picture below shows a marketing channel that is popular with farmers.

[Source: Farmers Weekly, 8 December 2021]

2.4.1 Identify the marketing channel illustrated in the picture above. (1)

2.4.2 Name the marketing system associated with the marketing channel identified in QUESTION 2.4.1. (1)

2.4.3 Justify the use of the marketing channel identified in QUESTION 2.4.1 by farmers by giving TWO reasons. (2)

2.4.4 Give TWO other channels, except the one stated in QUESTION 2.4.1, that farmers can use to market produce. (2)

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2.5 Entrepreneurial achievements depend on factors or personal characteristics required to be a successful entrepreneur.

> A South African agripreneur passionate about rural economic development and farming
> A South African entrepreneur (agripreneur) has been recognised as the second runner up for a Farmer of the Year Award in the Eastern Cape. The person is passionate about entrepreneurship, rural economic development, empowerment, and business coaching. The farming business, which trades in cattle, sheep, maize, and beans, has created jobs for six people and offers mechanisation services to surrounding farmers. The business also supports micro enterprises in the area. The farmer's father-in-law's underutilised farm was inspired by passion and legacy. The business is run by a highly qualified professional who left a successful banking career to create jobs and bring hope to a remote part of South Africa. The future plans involve building a vertically integrated agri-value chain business, focusing on secondary agriculture.

[Source adapted from article: Lionesses of Africa 1 October 2023 (https://www.lionessesofafrica.com)]

2.5.1 Define the term entrepreneur by referring to the information above. (2)

2.5.2 State THREE characteristics which are required to be a successful entrepreneur. (3)

2.5.3 The future plans are to expand and focus on secondary agriculture. Suggest TWO ways in which the farmer can build on the secondary agriculture. (2)

2.5.4 A business plan is important for a business to be sustainable in future. Identify THREE components of information that should be included in such a business plan. (3)

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QUESTION 3: PRODUCTION FACTORS AND MANAGEMENT

Start this question on a **NEW** page.

3.1 The picture below represents a commercial farming operation:

3.1.1 Give THREE functions of land as a production factor. (3)

3.1.2 Explain TWO methods to increase land productivity. (2)

3.2 The table below shows the amount of fertiliser applied and the yield of maize obtained on a piece of land.

FERTILISER (KG/HECTARE)	YIELD (TON/HECTARE)
35	3
40	3,5
45	4,5
40	5
50	5
60	4

3.2.1 Identify the economic characteristics shown by the data in the table above. (1)

3.2.2 Deduce the relationship between fertiliser and the maize yield. (4)

3.2.3 Draw a line graph showing the relationship between fertilisers applied to a piece of land indicating yield obtained. (6)

3.2.4 Describe the law of diminishing returns. (2)

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3.3 Labour is the collective term for all human, physical, and mental effort used in the production of goods and services.

3.3.1 Explain how the farmer will increase labour motivation and productivity through the following:

a) Training
b) Social conditions
c) Economic conditions (3)

3.3.2 Differentiate the following types of labour in the agricultural sector:

a) Casual labour (1)
b) Seasonal labour (1)
c) Skilled labour (1)

3.3.3 Describe the functions of the following labour legislation in South Africa.

a) Labour Relations Act No. 66 of 1997 (1)
b) Occupational Health and Safety Act No. 85 of 1993 (1)
c) Compensation for Occupational Injuries and Diseases Act No.1993 (1)

3.4 Production factors will only produce when they are well managed by the farmer.

[Source: https://www.istockphoto.com/illustrations/farmer-phone]

3.4.1 Name any TWO management skills that are important for a farmer. (2)

3.4.2 Describe the requirements of efficient control as one of the functions of management. (2)

3.4.3 Name TWO types of capital and link them to items in the picture above. (4)

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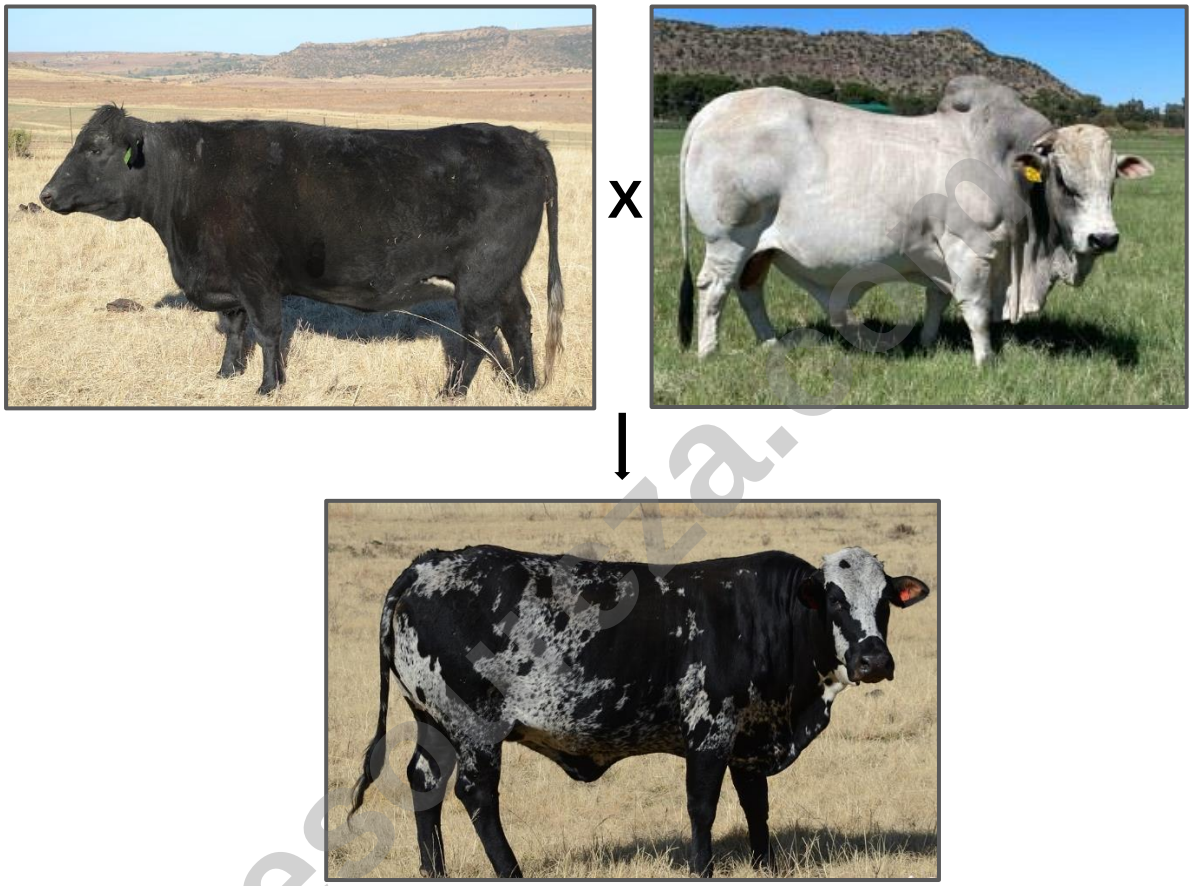
QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a **NEW** page

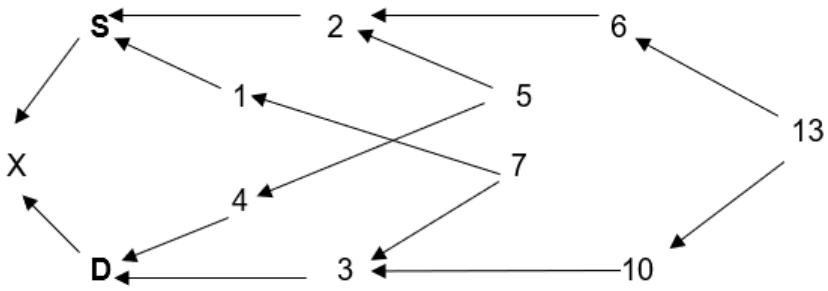
4.1 The pictures below show a cross between a black and white animal, where both colours are co-dominant. The offspring is a roan (i.e., both black and white coat).



4.1.1 Explain what '*co-dominance*' is. (3)

4.1.2 Use a Punnet square to cross two roan animals, where black is represented by (B) and white by (W). Also determine the phenotype ratio of offspring at the F1 generation. (6)

4.2 The flow chart below is a schematic representation of line breeding.



4.2.1 Give a definition for '*line breeding*'. (2)

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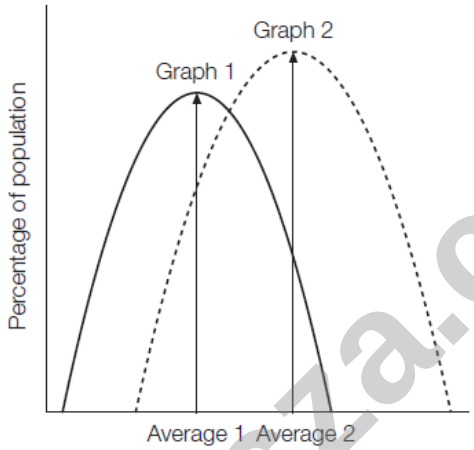
4.2.2 Identify THREE common ancestors of individuals **S** and **D** in the schematic representation above. (3)

4.2.3 Explain THREE ways in which livestock farmers could benefit from upgrading by using a purebred breed in their commercial cross-bred herd. (3)

4.3 The average milk production of a dairy herd (solid line) and a subsequent generation of the same herd (dotted line) are depicted in the two curves below.



4.3.1 Give a reason for the bell shape of the graph with the average in the centre. (3)

4.3.2 Explain why the average in the second graph (average 2) is higher than the average in the first graph (average 1). (2)

4.3.3 Deduce from the graph the part of the herd of dairy cattle (graph 2) that would have a positive influence if selected for breeding purposes. (2)

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4.4 Since the late 1990s, South Africa has led the way in the adoption of genetically modified crops. Important crops that have undergone genetic modification are maize, soybeans, and cotton.

4.4.1 Give THREE reasons why genetic manipulation may be a solution for improving food supply. (3)

4.4.2 State TWO applications of the genetic modification of plants. (2)

4.4.3 Give TWO reasons why some people are supporters of traditional cultivation of plants. (2)

4.4.4 Briefly describe TWO potential risks of GM crops. (2)

4.4.5 Give TWO reasons why maize plants are genetically modified. (2)

[35]

TOTAL SECTION B: [105]

GRAND TOTAL: [150]

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ANSWER SHEET: AGRICULTURAL SCIENCES PAPER 2
[STAPLE TO ANSWER BOOK]

SECTION A **TOTAL SECTION: [45]**

EXAMINATION NUMBER:

ID NUMBER:

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 × 2 = 20)

QUESTION 1.2

1.2.1 _____

1.2.2 _____

1.2.3 _____

1.2.4 _____

1.2.5 _____

(5 × 2 =10)

QUESTION 1.3

1.3.1 _____

1.3.2 _____

1.3.3 _____

1.3.4 _____

1.3.5 _____

(5 × 2 =10)

QUESTION 1.4

1.4.1 _____

1.4.2 _____

1.4.3 _____

1.4.4 _____

1.4.5 _____

(5 × 1 = 5)

_____
45

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