



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2016

**AGRICULTURAL SCIENCES P2
MEMORANDUM**

MARKS: 150

This memorandum consists of 12 pages.

SECTION A**QUESTION 1.1**

1.1.1 C ✓✓

1.1.2 A ✓✓

1.1.3 B ✓✓

1.1.4 D ✓✓

1.1.5 B ✓✓

1.1.6 A ✓✓

1.1.7 C ✓✓

1.1.8 A ✓✓

1.1.9 D ✓✓

1.1.10 B ✓✓ (10 x 2) (20)

QUESTION 1.2

1.2.1 D ✓✓

1.2.2 H ✓✓

1.2.3 A ✓✓

1.2.4 J ✓✓

1.2.5 G ✓✓ (5 x 2) (10)

QUESTION 1.3

1.3.1 Gene gun/Biolistics ✓✓

1.3.2 Grant ✓✓

1.3.3 Liabilities ✓✓

1.3.4 Seasonal worker ✓✓

1.3.5 Species crossing ✓✓
(5 x 2) (10)**QUESTION 1.4**

1.4.1 Genes ✓

1.4.2 shortage/under production ✓

1.4.3 Land/natural resources ✓

1.4.4 marketing mix ✓

1.4.5 Threats ✓
(5 x 1) (5)**TOTAL SECTION A: 45**

SECTION B**QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING****2.1 2.1.1 Description marked XX**

Surplus ✓ (1)

2.1.2 Explanation to QUESTION 2.1.1.

- The quantity supplied exceeds/is more than ✓ the quantity demanded. ✓
- The quantity demanded is lower/less than ✓ the quantity supplied.
- There is over supply of the product. ✓✓ (Any 1 x 2) (2)

2.1.3 Identification of letter K and lines MM and BB

K = equilibrium price ✓

MM = Supply curve ✓

BB = Demand curve ✓

(3)

2.2 2.2.1 Difference between *marketing* and *selling*.

| Marketing | Selling |
|---|---|
| Emphasis is on customers' wants ✓ | Emphasis is on the agricultural product ✓ |
| The business determines customers' wants and how to produce and deliver a product to satisfy those wants. ✓ | The business produces a product, and then decides how to sell it. ✓ |
| Management is profit oriented. ✓ | Management is sales-volume oriented. ✓ |
| Planning is long term, based on new products, tomorrows' markets and future growth. ✓ | Planning is short-term, based on current products and market. ✓ |
| Focuses on the wants of buyers. ✓ | Focus on the needs of sellers. ✓ |
| (Any 2 x 1) | (Any 2 x 1) |

(4)

2.2.2 Functions of agricultural marketing

- Transport ✓
- Storage ✓
- Packaging ✓
- Processing ✓
- Standardisation ✓
- Grading ✓
- Financing ✓
- Risk bearing ✓
- Market intelligence ✓
- Product design and promotion ✓
- Customer support ✓

OR

- Exchange functions ✓
- Physical functions ✓
- Facilitating functions ✓

(Any 2 x 1) (2)

2.2.3 How eco-labelling influences consumers

- Eco-labels certify that the product was produced in an environmentally friendly way. ✓
- They enable consumers to compare green shops. ✓
- It shows consumers how resources were used and managed during the production of the product. ✓

(Any 2 x 1) (2)

2.2.4 Reasons for processing meat

- It reduces wastage/decomposition ✓
- It provides job opportunities. ✓
- It increases the value of the meat ✓
- It is a way of overcoming over-supply of the product ✓
- It allows for easier packing and handling. ✓
- The products have a longer shelf life. ✓

(Any 2 x 1) (2)

2.3 2.3.1 Definition of marketing chain

- The flow of products from production point (farm) ✓ to consumption point (consumer). ✓

(2)

2.3.2 Post-harvest management of the marketing chain

- Collection ✓
- Selection/grading/standardisation ✓
- Packaging ✓
- Transformation ✓
- Added value ✓
- Transport ✓
- Sale of product ✓ (Any 2 x 1) (2)

2.3.3 Classification

- (a) Value adding – supply chain ✓ (1)
- (b) Packaging – supply chain ✓ (1)
- (c) Cash flow and profitability – demand chain ✓ (1)

2.4 2.4.1 Explanation of co-operative society

Group(s) of farmers/people who unite voluntarily ✓ to meet their mutual needs, whether economic or social. ✓ (2)

2.4.2 Benefits of agricultural cooperative

- They have more bargaining power. ✓
- Potential for growth. ✓
- Economies of scale through pooling resources. ✓
- They have access to better infrastructure. ✓
- They have access to professional expertise. ✓
- Middleman is eliminated. ✓
- They make bulk purchases. ✓
- They have access to funding. ✓
- They develop branding for themselves ✓ (Any 2 x 1) (2)

2.5 2.5.1 Characteristics of a buyer who is a traditionalist

- Will not buy new products and will try to convince other consumers not to either. ✓
- Will only buy products that they know and that are generally accepted as the preferred choice. ✓
- They make up only a small part of consumers. ✓ (Any 2 x 1) (2)

2.5.2 Ways sellers could make profit from the scenario

- By promoting what they sell ✓
- By adopting different approaches to market their goods. ✓ (2)

2.5.3 Ways to promote sales

- Advertise through newspapers, television, radio, magazines etc. ✓
- In-store promotion ✓
- Direct mailing through mobile phones, posts. ✓
- Trade fairs and exhibitions. ✓
- Personal selling ✓

(Any 2 x 1) (2)

2.6 Difference between *niche marketing* and *stock sales*

Niche marketing – The focus is on selling to a small segment of the market that is not served by mainstream produce suppliers. ✓

Stock sales – Livestock are sold on auction at a sale yard to the highest bidder. ✓

(2)

[35]

QUESTION 3: PRODUCTION FACTORS**3.1 3.1.1 Very scarce farm labourer**

Tractor operator/the skilled labourer/A ✓ (1)

3.1.2 Reasons to QUESTION 3.1.1

- A skilled labourer ✓
- He/she requires specialised training ✓
- He/he offers special service ✓ (Any 2 x 1) (2)

3.1.3 Methods to improve economic conditions for worker

- Provide incentives for workers ✓
- Paying higher salaries ✓
- Pay bonuses ✓
- Entering into partnership deals with workers ✓
- Providing medical insurance ✓
- Supplying farm products such as oranges or milk to workers at reduced prices. ✓ (Any 2 x 1) (2)

3.1.4 Laws that could apply

(a) Occupational Health and Safety Act ✓ (1)

(b) Unemployment Insurance Fund (UIF) Act ✓ (1)

3.2 3.2.1 Calculations

Total amount invested

$R15\ 000,00 + R28\ 000,00 + R20\ 000,00 \checkmark = R63\ 000,00 \checkmark$

Gross income R73 000,00

Profit/loss $R73\ 000,00 - R63\ 000,00 = R10\ 000,00 \checkmark$ profit ✓ (3)

3.2.2 Methods used to raise the capital

- Borrowed money from the bank
- Borrowed money from a friend
- Sold chickens (Any 2 x 1) (2)

3.2.3 Methods the manager could use to create capital

- Own savings ✓ (2)

3.2.4 Document that shows expected income and expenditure

- Budget ✓ (1)

3.3 3.3.1 Characteristic of land in photograph

- Agricultural land is limited. ✓ (1)

3.3.2 Justification

- The land/mountainous land is not suitable for commercial farming. ✓
- Agricultural land with high production potential is limited. ✓
- Agricultural land varies in production potential ✓ (Any 2 x 1) (2)

3.3.3 Functions of land as a factor of production in agriculture

- It provides space for agricultural activities ✓
- It is a source of minerals ✓
- It provides food for plants and animals ✓
- It is an asset that can be used as a collateral ✓
- It is a source of raw materials ✓ (Any 3 x 1) (3)

3.3.4 Scientific way to improve productivity of land

- Improving soil fertility/application of fertilisers ✓
- Improving water management/irrigation ✓
- Changing cropping practices and farming systems ✓
- Restoring land potential/soil reclamation ✓
- Farming land more efficiently/consolidating small fields ✓ (Any 2 x 1) (2)

3.4 3.4.1 Why managing a poultry farm is different from managing a shop.

- The kind and daily duties involved when managing a poultry farm. ✓
- The management of layers involved in farming ✓
- Specific skills needed for different farming operations ✓ (Any 2 x 1) (2)

3.4.2 Specific management skills

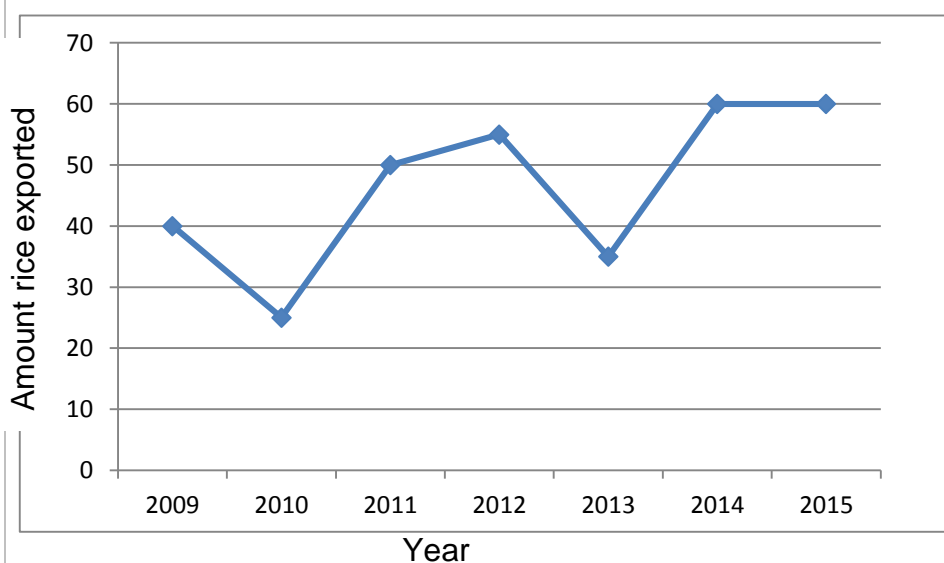
- (a) Financial management ✓
 - (b) Labour management ✓
 - (c) Crises management ✓
- (3)

3.4.3 Production risks in crop production

- Weather hazards/drought/hail/storm ✓
 - Pests/rodents ✓
 - Fire ✓
 - Equipment breakdown ✓
- (Any 2 x 1) (2)

3.5

Tons of rice exported by a commercial farmer for seven years

**Criteria for marking**

- Correct heading/title ✓
 - Correct labelling of X-axis and Y-axis ✓
 - Correct scaling, using ruler ✓
 - Line graph ✓
 - Correct plotting on line graph ✓
- (5)
[35]

QUESTION 4: BASIC AGRICULTURAL GENETICS**4.1 4.1.1 Calculation of EBV (Estimated Breeding Value)**

Average weaning weight of the animals = 22,5 kg

Weaning weight of male animal = 24,6 kg

Weaning weight of female animal = 23,7

EBV of male = $24,6 \text{ kg} - 22,5 \text{ kg} \checkmark = +2,1 \text{ kg} \checkmark$

EBV of female = $23,7 \text{ kg} - 22,5 \text{ kg} \checkmark = +1,2 \text{ kg} \checkmark$ (4)

4.1.2 Expected genetic gain

$(\text{EBV of male} + \text{EBV of female}) \div 2 \times 50\%$

$(2,1 \text{ kg} + 1,2 \text{ kg}) \div 2 \times 50\% \checkmark$

$3,3 \div 2 \times 0,5$

$= 0,81 \text{ kg} \checkmark$

(Any 2 x 1) (2)

4.2 4.2.1 Punnet square \checkmark

| | | |
|---|----|-----------------|
| $\begin{array}{c} \diagup \text{♂} \\ \text{♀} \end{array}$ | Q | Q \checkmark |
| q \checkmark | Qq | Qq |
| q | Qq | Qq \checkmark |

(4)

4.2.2 Percentage of white-faced bull in F2 generation

F2 generation

White (QQ) will be 3

Black (qq) will be 1

Percentage of white (QQ) = $\frac{3}{4} \times 100 \checkmark = 75\% \checkmark \checkmark$

(3)

4.2.3 Appropriate genetic term

- Variation

(1)

4.2.4 Difference between phenotype and genotype

Phenotype:

- The visible or observable characteristics of an individual. \checkmark

Genotype:

- The genetic composition of an individual. \checkmark

(2)

4.3 4.3.1 Chromosomes of the zygote

58 ✓ + XX chromosomes ✓ (2)

4.3.2 Gender of offspring in QUESTION 4.3.1

- Female (1)

4.4 Definitions of terms

(a) Mutation – a sudden random change ✓ in the genetic composition/
material (DNA) cell. ✓ (2)

(b) Out crossing – crossing of a line-bred breed ✓ with an unrelated
breed. ✓ (2)

4.5 4.5.1 Aims of genetic modification in plants

- Indirectly improving crop yield by making it easier to manage
pests, diseases and weeds that can interbreed. ✓
- Directly improving crop yield by improving tolerance to extreme
environmental conditions. ✓
- Improving commercial properties, such as flavour and shelf-
life. ✓
- Increasing the nutritional value of crops (biofortification). ✓
- Producing pharmaceutical crops that produce proteins, drugs
and vaccines for humans. ✓ (Any 2 x 1) (2)

4.5.2 Advantages of GMO over traditional methods

- GMO is faster ✓
- It is precise ✓
- It is not limited to crossing species ✓
- Genes from a micro-organism can be transferred to the DNA of
a plant and the other way round. ✓ (Any 2 x 1) (2)

4.5.3 Disadvantages of inbreeding

- Expert knowledge needed as it can be a complicated method ✓
- No certainty that a superior inbred line with outstanding traits
will be produced. ✓
- Bad characteristics may become so fixed that they cannot be
bred out. ✓
- Reduced vigour and production ✓
- Deformed animals occur more frequently ✓
- Inbreeding depression may occur ✓
- Leads to decrease in variation ✓ (Any 2 x 1) (2)

4.5.4 Pedigree selection

It is a selection based on the records of an individual's ancestors on both the mother's and father's side. ✓✓

Progeny selection

Selection of individuals based on the records of their offspring. ✓✓

(2 + 2) (4)

4.6 Environmental causes of variation in plants

- Soil factors ✓
- Sunlight ✓
- Water ✓
- Temperature ✓
- Pest and diseases ✓

(Any 2 x 1) (2)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150