**basic education**

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

# SENIOR CERTIFICATE EXAMINATIONS/
# NATIONAL SENIOR CERTIFICATE EXAMINATIONS

## AGRICULTURAL SCIENCES P2

## MAY/JUNE 2024

## MARKING GUIDELINES

**MARKS:  150**

**These marking guidelines consist of 10 pages.**

**SECTION A**

**QUESTION 1**

1.1    1.1.1    C ✓✓
       1.1.2    B ✓✓
       1.1.3    D ✓✓
       1.1.4    D ✓✓
       1.1.5    A ✓✓
       1.1.6    B ✓✓
       1.1.7    B ✓✓
       1.1.8    C ✓✓
       1.1.9    D ✓✓
       1.1.10   A ✓✓                                      (10 x 2)    (20)

1.2    1.2.1    D ✓✓
       1.2.2    H ✓✓
       1.2.3    E ✓✓
       1.2.4    J ✓✓
       1.2.5    B ✓✓                                      (5 x 2)    (10)

1.3    1.3.1    Price elasticity of demand ✓✓
       1.3.2    Income statement ✓✓
       1.3.3    Heterozygote/crossbreed/hybrid ✓✓
       1.3.4    Quantitative ✓✓
       1.3.5    Prepotency ✓✓                             (5 x 2)    (10)

1.4    1.4.1    Standardisation/grading ✓
       1.4.2    Variable ✓
       1.4.3    Epistasis ✓
       1.4.4    Physical ✓
       1.4.5    Inbreeding depression/degeneration ✓      (5 x 1)    (5)

                                           **TOTAL SECTION A:    45**

**SECTION B**

**QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING**

2.1    **Marketing functions**

2.1.1    **Identification of the marketing function**
A    Transportation ✔                                          (1)
B    Storage ✔                                                 (1)
C    Packaging ✔                                               (1)

2.1.2    **Guidelines for packaging**
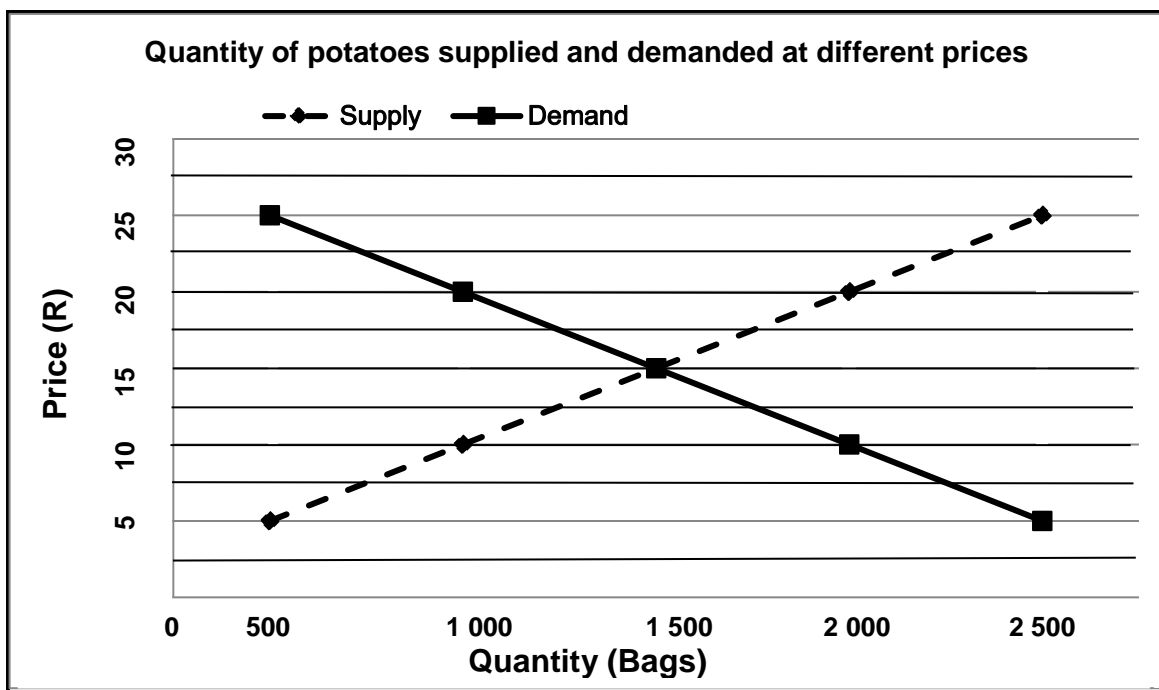E    Product identification ✔                                  (1)
F    Containment ✔                                             (1)

2.1.3    **TWO advantages of processing**
- Increases the value of the product ✔
- A way of overcoming over-supply of product ✔
- Allows easier packaging, handling and transportation ✔
- Provides job opportunities ✔
- Enables the farmer to increase their share of final price paid for a product ✔
- Results in a product that has a longer shelf life ✔
- Reduces wastage of excess produce/prevent food spoilage ✔
- Improves food safety ✔
- Product is available throughout the year ✔          (Any 2)    (2)

2.2 **Supply, demand and price**

2.2.1 **Line graph**



**Quantity of potatoes supplied and demanded at different prices**

CRITERIA/RUBRIC/MARKING GUIDELINES
- Correct heading ✓
- X-axis: Correctly calibrated and labelled (Quantity) ✓
- Y-axis: Correctly calibrated and labelled (Price) ✓
- Correct units (Bags and R) ✓
- Line graph ✓
- Accuracy (80% + correct plotting) ✓ (6)

2.2.2 **Law of supply**
- The higher the price the more the quantities of potatoes supplied ✓✓
- The lower the price the lesser the quantities of potatoes supplied ✓✓ (Any 1) (2)

2.2.3 **Condition in a market when the price is R15**
Market equilibrium/equilibrium point ✓ (1)

2.2.4   **TWO factors influencing the demand of potatoes other than price**
- Quality ✔
- Consumer preferences/taste ✔
- Income/buying power of consumers ✔
- Number of consumers ✔
- Price of competing/complementary/substitutes products ✔
- Range of products available ✔
- Use of the product ✔
- Fashion ✔
- Festive seasons ✔
- Advertisement ✔
- Legislation ✔
- Sociological ✔
- Research ✔          (Any 2)     (2)

2.3   **Approaches to agricultural marketing**
**A**   Multi-segment ✔          (1)
**B**   Green marketing ✔          (1)
**C**   Niche marketing ✔          (1)

2.4   **Marketing channels of free marketing system**

2.4.1   **Identification of the marketing channel**
Internet/online marketing channel ✔          (1)

2.4.2   **TWO advantages of the internet marketing channel for the farmer**
- A large market can be reached/global reach ✔
- Money can be transferred before goods are delivered ✔
- Faster method to reach the consumers ✔
- Time saving/convenience ✔
- Cost effective/less capital intensive ✔
- Flexible/accessible anytime ✔          (Any 2)     (2)

2.4.3   **TWO marketing channels other than internet marketing**
- Farm gate ✔
- Fresh produce ✔
- Stock sales/auctions ✔
- Direct/contact ✔          (Any 2)     (2)

2.5   **Factors hampering marketing of agricultural products**

2.5.1   Bulkiness ✔          (1)
2.5.2   Costs for intermediaries/middlemen ✔          (1)
2.5.3   Perishability/spoilage ✔          (1)
2.5.4   Risk/delays/spoilage/theft ✔          (1)
2.5.5   Seasonal fluctuations ✔          (1)

2.6    **Entrepreneurial success factors**

    2.6.1    B ✔           (1)
    2.6.2    D ✔           (1)
    2.6.3    C/D ✔        (1)
    2.6.4    A ✔           (1)
                                  **[35]**

## QUESTION 3: PRODUCTION FACTORS

3.1    **Land**

    3.1.1    **Letter representing the functions of land**

        **(a)    Provision of food -** C ✔          (1)
        **(b)    Provision of space for infrastructure -** B ✔     (1)

    3.1.2    **Economic characteristic of land**
        **A**    Land is limited ✔        (1)
        **D**    Value of land appreciates ✔     (1)

    3.1.3    **TWO ways in which land productivity can be improved**
        • Water management/provision/irrigation ✔
        • Consolidating small uneconomical land units ✔
        • Farming land more efficiently/precision farming/ use scientific farming methods ✔
        • Improving soil fertility ✔
        • Changing cropping practices ✔
        • Restoring land potential ✔
        • Responsible use of pesticides ✔     (Any 2)    (2)

    3.1.4    **The law of diminishing return**
        With the continued addition of more of one input to a productive process while other inputs are kept constant, a point will be reached where the output per unit of the added input will decline ✔✔     (2)

3.2    **Labour productivity**

    3.2.1    Motivation ✔         (1)
    3.2.2    Education ✔         (1)
    3.2.3    Recognition/motivation ✔     (1)
    3.2.4    Communication ✔       (1)

3.3 **Labour skills**

3.3.1 **Indication of the best candidate as**

    **(a)** **Person to manage the business optimally -** Candidate 2 ✓ (1)
    **(b)** **A technical advisor -** Candidate 1 ✓ (1)

3.3.2 **TWO reasons for the answer in QUESTION 3.3.1 (a)**
- Higher scores/82% management skills/ability in management ✓
- Higher scores/80% interpersonal skills/
  ability in interpersonal skills ✓ (2)

3.3.3 **Legislation regulating**

    **(a)** **Safety**
    Occupational Health and Safety Act/OHSA (No. 85 of 1993) ✓ (1)
    **(b)** **Participation in decision making**
    Labour Relations Act/LRA (No. 66 of 1995) ✓ (1)

3.4 **Capital**

3.4.1 **Types of capital**

    **(a)** C ✓ (1)
    **(b)** B ✓ (1)
    **(c)** A ✓ (1)

3.4.2 **ONE source of capital**
Financial institution/commercial banks/trust companies/Land bank/
development bank/agricultural cooperatives/business partners/credit/
production/grants/inheritance/family and friends/savings ✓ (1)

3.5 **Balance sheet for the 28th of February 2023**

3.5.1 **Identification of the financial statement**
Balance sheet ✓ (1)

3.5.2 **Provide the missing information for**
    **(a)** Value of the farm ✓ (1)
    **(b)** Bank overdraft ✓ (1)
    **(c)** R4 000 000 ✓ (1)
    **(d)** R2 210 000 ✓ (1)

3.6     **Income and expenditure graph**

3.6.1   **Identification of a farmer with highest income**
        Farmer B ✔                                                         (1)

3.6.2   **Calculating the profit or loss for farmer A**
        Profit or loss = Total value of income **–** Total value of expenditure ✔
                       = R30 000 **–** R50 000 ✔
                       = **–** R20 000/loss ✔                              (3)

3.7     **Management**

3.7.1   **Management principles**
        **(a)**   Control ✔                                               (1)
        **(b)**   Implementation ✔                                        (1)

3.7.2   **TWO external forces that affect a farming business**
        • Technological forces ✔
        • Socio-cultural forces ✔
        • Legal forces ✔
        • Political forces ✔
        • Ethical forces ✔
        • Economic forces ✔
        • Environmental forces ✔
        • Competitive forces ✔                              (Any 2)   (2)
                                                                      **[35]**

## QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1     **Monohybrid crossing**

4.1.1   **Punnett square**

| Gametes | B | b |
|---|---|---|
| b | Bb | bb |
| b | Bb | bb |

        **CRITERIA FOR MARKING**
        • Gametes of parent 1 ✔
        • Gametes of parent 2 ✔
        • Genotype of offspring ✔
        • Punnet square populated with gametes and offspring
          genotypes ✔                                                     (4)

4.1.2   **Calculation of the percentage of pink flowers**
        • = 2÷4 x 100 ✔
        • = 50%   ✔                                                       (2)

4.1.3 **Calculate the number of heterozygous offspring**
- $= 2\div4 \times 350$ ✔
- $= 175$ ✔ (2)

4.2 **Monohybrid crossing presentation**

4.2.1 **Pattern of inheritance shown by Pair 1**
Incomplete dominance/co-dominance ✔ (1)

4.2.2 **Justification for co-dominance/incomplete for pair 1**
The alleles for both parents are dominant ✔ (1)

4.2.3 **The phenotype of Pair 2 offspring**
All round fruits ✔ (1)

4.2.4 **Genotypic ratio of Pair 2 offspring**
1AA **:** 1Aa ✔ (1)

4.3 **Crossing schematic representation**

4.3.1 **Mendel law that applies in the crossing**
The law of segregation ✔ (1)

4.3.2 **The process that resulted to (7)**
Fertilization ✔ (1)

4.3.3 **Genotypes and phenotypes**
- **(a)** **(2)** White ✔ (1)
- **(7)** Dark ✔ (1)
- **(b)** **(1)** DD ✔ (1)
- **(6)** d ✔ (1)

4.4 **Variation**

4.4.1 **Genetic term**
Variation ✔ (1)

4.4.2 **TWO other internal factors**
- Mutation ✔
- Random fertilization ✔ (2)

4.4.3 **TWO methods of selecting farm animals**
- Progeny selection ✔
- Family selection ✔
- Pedigree selection ✔
- Mass selection ✔ (Any 2) (2)

4.5     **Crossbreeding Holstein cows with Dairy Swiss bulls**

    4.5.1    **The breeding system**
           Crossbreeding ✔                                                                                                (1)

    4.5.2    **Reason for crossbreeding**
           Two different/unrelated breeds were used ✔                                          (1)

    4.5.3    **TWO advantages of crossbreeding from the case study**
- An improvement in the growth rate of the calves ✔
- Offspring were better adapted to hot conditions ✔
- Udders and legs improved ✔                              (Any 2)     (2)

    4.5.4    **Differentiation**
           **Inbreeding**
           Mating of animals that are related to one another ✔                           (1)
           **Line breeding**
           Mating of animals that are closely related to an outstanding ancestor/
           bull ✔                                                                                                             (1)

    4.5.5    **ONE example for each of the breeding systems**
           **Inbreeding -** Father and daughter/son and mother/brother and sister ✔     (1)
           **Line breeding -** A bull with heifers from the second generation ✔          (1)

4.6     **Genetically modified organisms**

    4.6.1    **TWO potential risks of genetically modified crops to the environment**
- Can produce super weeds ✔
- Insect resistant plants can kill beneficial insects ✔
- Use of excessive amounts of herbicides may damage the soil ✔
- Loss of biodiversity/useful plants can be destroyed ✔
- Reduce the effectiveness of herbicides/pesticides ✔     (Any 2)     (2)

    4.6.2    **TWO benefits of genetically modified crops**
- Environmental benefits ✔
- Health benefits ✔
- Economic benefits ✔                              (Any 2)     (2)
                                                                 **[35]**

                                                  **TOTAL SECTION B:     105**
                                                    **GRAND TOTAL:     150**