SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P2

JUNE 2017

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 9 pages.
SECTION A

QUESTION 1

1.1  
1.1.1 D ✓ ✓  
1.1.2 C ✓ ✓  
1.1.3 B ✓ ✓  
1.1.4 D ✓ ✓  
1.1.5 A ✓ ✓  
1.1.6 C ✓ ✓  
1.1.7 A ✓ ✓  
1.1.8 D ✓ ✓  
1.1.9 D ✓ ✓  
1.1.10 B/C/D ✓ ✓  

1.2  
1.2.1 E ✓ ✓  
1.2.2 J ✓ ✓  
1.2.3 C ✓ ✓  
1.2.4 D ✓ ✓  
1.2.5 B ✓ ✓  

1.3  
1.3.1 Fixed price/cost/price fixing/hedging ✓ ✓  
1.3.2 Management ✓ ✓  
1.3.3 Inversion ✓ ✓  
1.3.4 Polygenic ✓ ✓  
1.3.5 Cross breeding/out crossing ✓ ✓  

1.4  
1.4.1 Market segment ✓  
1.4.2 Closing balance ✓  
1.4.3 Continuous ✓  
1.4.4 Biometrics ✓  
1.4.5 Heterosis/hybrid vigour ✓  

TOTAL SECTION A: 45
SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

2.1 Market functions

2.1.1 The letter representing the functions of marketing
(a) C ✓ (1)
(b) B/D ✓ (1)
(c) D ✓ (1)
(d) A ✓ (1)

2.1.2 THREE advantages of processing agricultural products
- Prevents spoilage/perishability/increases shelf life/increases storage period ✓
- The product is available throughout the year ✓
- Improves food safety ✓
- Easy to transport ✓
- Adds/increases value/quality/usefulness of product ✓
- It provides job/business opportunities ✓
- Reduces wastage of excess produce ✓
- It is a way of overcoming over-supply of products ✓
- It allows for easier packing and handling of products ✓
- Higher price of products/higher income/profit ✓ (Any 3) (3)

2.2 Marketing channels

2.2.1 Farm gate marketing ✓ (1)
2.2.2 Stock auction ✓ (1)
2.2.3 Contract market ✓ (1)
2.2.4 Fresh produce market ✓ (1)
2.2.5 Internet marketing ✓ (1)

2.3 Graph on price equilibrium

2.3.1 Identification of curves
- A Demand ✓ (1)
- B Supply ✓ (1)

2.3.2 THREE factors affecting demand
- Price of the product ✓
- Quality of products/usefulness of product ✓
- Consumer preferences/fashion/taste of consumers ✓
- Range of products available/substitute/complimentary products ✓
- Season/time/period of production ✓
- Income/status of consumers/buying power of consumers ✓
- Number of consumers ✓ (Any 3) (3)
2.3.3 Definition of equilibrium
The price where the supply ✓ is equal to the demand ✓ (2)

2.3.4 Relationship between the price and the quantity demanded
The higher the price, the lower the quantity demanded ✓✓
OR
The lower the price, the higher the quantity demanded ✓✓ (2)

2.4 The number of potatoes bought at different prices per week

2.4.1 Line graph showing the quantities of potatoes bought at different prices

![Line graph showing the quantities of potatoes bought at different prices](image)

Criteria/rubric/memorandum
- Correct heading ✓
- X axis: Correctly calibrated and labelled (Quantity) ✓
- Y axis: Correctly calibrated and labelled (Price) ✓
- Correct units (R and bags) ✓
- Line graph ✓
- Accuracy ✓ (6)

2.4.2 The price when most potatoes were bought
R10 ✓ (1)

2.4.3 Reason
400 bags of potatoes were bought when the price was R10/the highest quantity was bought at R10/lowest price/highest quantity bought at the lowest price ✓ (1)
2.5 **THREE problems encountered when drawing up a business plan**
- Insufficient research done ✓
- Vague business plan ✓
- Insufficient cash flow allocated ✓
- Unrealistic assumption and projections ✓
- Hiding weaknesses and risks ✓
- Not highlighting potential competition ✓
- Using the incorrect format ✓
- Inconsistent information on supplies ✓

(Any 3) (3)

2.6 **THREE elements of the SWOT analysis**
- Strengths ✓
- Weaknesses ✓
- Opportunities ✓
- Threats ✓

(Any 3) (3)

**QUESTION 3: PRODUCTION FACTORS**

3.1 **The budget of a small-scale farmer for a year**

3.1.1 **ONE cost item that can be repaid over a period of five years**
Loan (tractor) ✓

(1)

3.1.2 **Reason for the answer**
A tractor is a medium term asset ✓

(1)

3.1.3 **Calculation of the highest income generated**
- R200 000 + R120 000 ✓
- = R320 000 ✓

(2)

3.1.4 **TWO problems associated with a medium term asset**
- Interest rate on loan ✓
- Depreciation ✓

(2)

3.1.5 **The profit of the enterprise**
- Profit = income – expenditure ✓
- R320 000 – R252 500 ✓
- Profit = R67 500 ✓

(3)

3.2 **Labour legislation**

3.2.1 Basic Conditions of Employment Act, 1997 (Act 75 of 1997) ✓

(1)

3.2.2 Skills Development Act, 1998 (Act 97 of 1998) ✓

(1)

3.2.3 Occupational Health and Safety Act, 1993 (Act 85 of 1993) ✓

(1)
3.3 **Scenario on labour as a production factor**

3.3.1 **Identification of the type of labourers**

- Seasonal labourers ✓

3.3.2 **Distinction between a permanent and a seasonal labourer**

- **Seasonal labourer**
  - Employed only for harvesting/specific time/peak period of the year/season ✓

- **Permanent labourer**
  - Permanently employed throughout the year ✓

3.4 **THREE challenges of labour as a production factor**

- Shortages/scarcity of labour ✓
- High cost of labour ✓
- Lack of skills/training ✓
- Competition from other industries/economic migrants ✓
- Poor labour management/working conditions ✓
- Social problems/HIV and AIDS ✓
- Industrial action/strikes ✓

(Any 3)

3.5 **Calculation of the wage of the labourer working on a public holiday**

- \( R150 \times 2/R150 + R150 \ ✓
- \( = R300 \ ✓

3.6 **Management principles**

3.6.1 **Association of the statement with the management principles**

- A Control/supervision ✓
- B Organization/coordination ✓
- C Planning ✓

(Any 3)

3.6.2 **THREE business managerial skills of a manager to perform duties at C**

- Conceptual ✓
- Analytical ✓
- Planning ✓
- Problem solving ✓
- Application skills ✓
- Financial management skills ✓
- Implementation ✓
- Decision making ✓

(Any 3)

3.7 **Scenario on the increasing of land productivity**

3.7.1 Consolidation/consolidating uneconomic units/mechanisation ✓

3.7.2 Scientific methods/improve soil fertility/crop rotation/inter cropping ✓
3.7.3 Restoring land potential ✓ (1)

3.7.4 Improving water management ✓ (1)

3.8 Explanation with an example the law of diminishing return
- As the quantity of an input is increased, the yield (output) will increase ✓
- until a specific point, thereafter it will increase at a decreasing rate ✓
- Example (fertilizer application and maize yield) ✓ (3)

3.9 TWO functions of land as a production factor
- Source of minerals ✓
- Used as a collateral ✓
- Provides physical space for production ✓
- Provides raw materials ✓
- Food production ✓ (Any 2) (2)

QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1 Crossing of yellow and white flowers

4.1.1 Provision of the labels (a) - (e)
(a) Yy ✓
(b) Yellow ✓
(c) Yy ✓
(d) 3:1 (Yellow to white) ✓
(e) 1:2:1 ✓ (5)

4.1.2 Type of dominance
Complete dominance ✓ (1)

4.1.3 Justification
- Yellow colour (Y) is dominant over white colour (y) ✓
- No intermediate/new colour in the offspring ✓ (Any 1) (1)

4.2 TWO crosses in F₁ generation

4.2.1 Indication of the type of crossing
Monohybrid ✓ (1)

4.2.2 Reason
Crossing involving only one characteristic/trait ✓ (1)

4.2.3 Prediction of the genotype of parents in the first crossing
- Parent 1  Bb ✓
- Parent 2  bb ✓
OR
- Bb ✓ x bb ✓ (2)
4.2.4 **Punnet square determining the genotypic percentage of the offspring in the second crossing**

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>B ✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>♀ b</td>
<td>Bb</td>
<td>Bb ✓</td>
</tr>
<tr>
<td>b</td>
<td>Bb</td>
<td>Bb</td>
</tr>
</tbody>
</table>

Punnett square with gametes and offspring ✓

Genotypic percentage of the offspring is 100% ✓

**Marking guidelines**
- Complete Punnett square with gametes and offspring ✓
- Correct gametes ✓
- Correct offspring ✓
- Correct percentage ✓ (4)

4.2.5 **Calculation of the phenotypic percentage of the offspring in the second crossing**

Phenotypic % = \( \frac{4}{4} \times 100 \) ✓

= 100% black ✓ (2)

4.3 **Scenario on Genetic Modification**

4.3.1 **Identification of the advantage of GM seed over the traditional seed**
- Yield doubled during the first harvest ✓
- Spraying against bollworm is reduced/less costs ✓ (Any 1) (1)

4.3.2 **TWO possible techniques used to modify the cotton seed**
- Bacterial carriers/ *Agrobacterium tumefaciens* ✓
- Gene gun/ biolistic ✓
- Electroporation ✓
- Micro - injection ✓
- Lipofection ✓
- Viral carriers ✓
- Gene silencing ✓
- Gene slicing ✓
- Gene recombination ✓
- Calcium-phosphate precipitation ✓ (Any 2) (2)

4.3.3 **TWO economic benefits of using genetically modified seed to the farmer**
- Reduced cost for pesticides ✓
- Higher yield/ more income ✓ (2)

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4.3.4 **TWO impacts of using the GM cotton seed**

(a) **Environment**
- Less spraying leads to reduced pollution of environment ✓
- Leads to herbicide resistant crops/super weeds ✓
- Beneficial insects/pests are killed when feeding on insect resistant crops ✓
- Biodiversity is reduced ✓

(b) **Economic**
- Seeds are expensive/farmers have to buy new seed yearly/ farmers may not retain seeds for breeding purposes ✓
- High input costs as farmers must pay a technology fee ✓

4.4 **Breeding systems**

4.4.1 Cross breeding/upgrading ✓

4.4.2 Inbreeding ✓

4.4.3 Upgrading ✓

4.4.4 Species crossing ✓

4.5 **Breeding Value (BV)**

4.5.1 **Calculation of the weaning weight of the progeny in kilograms**

\[
\frac{16 + 6}{2} = \frac{22}{2} = 11 \text{ kg} \hspace{1cm} \text{OR}
\]

\[
(16 \div 2) + (6 \div 2) = 8 + 3 = 11 \text{ kg} \hspace{1cm} (3)
\]

4.5.2 **Interpretation of the figure**

The offspring of these parents will be 11 kg heavier ✓ than the average of the herd ✓

[35]

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TOTAL SECTION B: 105
GRAND TOTAL: 150
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