AGRICULTURAL SCIENCES P2

2016

MEMORANDUM

MARKS: 150

This memorandum consists of 9 pages.
**SECTION A**

**QUESTION 1**

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

(10 x 2) (20)

| 1.2  | 1.2.1 | C ✓ ✓ |
| 1.2.2 | G ✓ ✓ |
| 1.2.3 | F ✓ ✓ |
| 1.2.4 | J ✓ ✓ |
| 1.2.5 | A ✓ ✓ |

(5 x 2) (10)

| 1.3  | 1.3.1 | Entrepreneurs ✓ ✓ |
| 1.3.2 | Contract ✓ ✓ |
| 1.3.3 | Heritability ✓ ✓ |
| 1.3.4 | Mutation ✓ ✓ |
| 1.3.5 | Genetic modification/engineering ✓ ✓ |

(5 x 2) (10)

| 1.4  | 1.4.1 | Marketing ✓ |
| 1.4.2 | Public holidays ✓ |
| 1.4.3 | Variation ✓ |
| 1.4.4 | Selection ✓ |
| 1.4.5 | Polygenes ✓ |

(5 x 1) (5)

**TOTAL SECTION A:** 45
SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

2.1 Differences between farmer and consumer price

2.1.1 Commodity with highest price difference
   Processed meat ✓ (1)

2.1.2 Reason for the higher price difference
   More/higher costs/processing/value adding ✓ (1)

2.1.3 Reason for the low price difference in wheat grain
   • Raw material/less capital/labour intensive/unchanged product ✓
   • Demand and supply ✓
   • Marketing cost ✓ (Any 1) (1)

2.1.4 Main problems in marketing the products with regard to:
   (a) Value - Plant products have a low value per mass/animal products have a high value per mass ✓ (1)
   (b) Transportation - Animal/plant products need special facilities ✓ (1)
   (c) Perishability - Animal/plant products are easily perishable ✓ (1)

2.1.5 THREE factors that resulted in the difference in price
   • Transportation costs ✓
   • Marketing costs ✓
   • Special treatment/cooling facilities/storage ✓
   • Packaging ✓
   • Profit margin/middle man ✓
   • Levies/taxes ✓
   • Demand and supply ✓ (Any 3) (3)

2.2 Flow diagram illustrating the phases of entrepreneurial process

Illustrating the phases of the entrepreneurial process

A - Identifying/evaluation the opportunity ✓ (1)
B - Determine the resources required ✓ (1)
C - Develop a business plan ✓ (1)
D - Starting/managing the enterprise ✓ (1)

2.3 Possible markets for their products

2.3.1 Identification of the market with the highest security risk
   Local people who buy directly from the farm ✓ (1)

2.3.2 Indication of the best suited market for the marketing of beef
   Large supermarket chains ✓ (1)
   Reason
   Large scale sales/assured market/secure market/pay the best prices ✓ (1)
2.3.3 **Definition of the concept livestock auction sale**
- Gathering of buyers and sellers of livestock ✓
- To bid for the highest price ✓

(2)

2.3.4 **THREE advantages of marketing to small butcheries**
- Selling small quantities at regular intervals ✓
- Selling to many outlets/regular cash flow ✓
- No middle man ✓
- Payment on the spot/cash sales ✓
- Direct interaction between buyers and sellers ✓

(Any 3)

(3)

2.4 **Case study on dairy farmers**

**Appropriate marketing term associated with the following:**

2.4.1 Entrepreneurship ✓
2.4.2 Niche market ✓
2.4.3 Innovation/entrepreneurship ✓
2.4.4 Diversification ✓
2.4.5 Risk management ✓

(1)

(1)

(1)

(1)

2.5 **The quantities of oranges that were sold at different prices per week**

2.5.1 **Line graph to indicate oranges sold per week**

![Line graph](image)

**Criteria/rubric/markign guidelines**
- Correct heading ✓
- X-axis: Correct calibrations and labelled (Quantity of oranges sold) ✓
- Y-axis: Correct calibrations and labelled (Price per bag) ✓
- Correct unit (Rand and bags) ✓
- Accuracy ✓
- Line graph ✓

(6)
2.5.2 Comparing the demand to the supply with reference to price

- The higher the price ✔ the higher the supply ✔
  the lesser the demand ✔

OR

- The lower the price ✔ the lower the supply ✔
  the higher the demand ✔

QUESTION 3: PRODUCTION FACTORS

3.1 A budget for a rose producer in a greenhouse for the year 2015/16

3.1.1 The management principle that this budget addresses
- Planning ✔

3.1.2 Calculate the profitability of this enterprise
- Profit/loss = Estimated returns – Estimated costs ✔
- = R477 500 – R143 564 ✔
- Profit = R333 936 ✔

3.1.3 Reasons for rose production
- It is recommended ✔
- Show a profit ✔

3.1.4 TWO measures to be more environmentally friendly
- Use green energy ✔
- Use more manure/organic farming systems ✔
- Use less chemicals ✔ (Any 2)

3.2 Absenteeism, social and financial problems

3.2.1 TWO labour challenges
- Low wages ✔
- Lack of training/unskilled labour ✔
- Low productivity ✔
- Long working hours ✔ (Any 2)

3.2.2 Statements associated with legislation
- (a) Wages/working hours ✔
- (b) Provided a training centre to address training/educational needs ✔

3.2.3 THREE conditions to motivate employees
- Higher wages/payment of employees ✔
- Full time nurse/primary health care ✔
- Social worker ✔
- Provision of housing ✔
- Education/training ✔ (Any 3)
3.3 **Management in a farming enterprise**

3.3.1 **Indication of management skill in picture B**
Communication/interpersonal skill/problem solving ✓

3.3.2 **Justification**
There is communication between the farming personnel ✓

3.3.3 **Identification of a risk management strategy in picture A**
Diversification ✓

3.3.4 **TWO reasons visible in the picture**
- Pasture production ✓
- Horticulture ✓
- Field crop ✓
- Fodder production ✓
- Timber production/orchard ✓

3.3.5 **TWO principles enabling the manager to farm successfully**
- Planning ✓
- Implementation ✓
- Control ✓
- Organisation ✓
- Leadership
- Decision making ✓

3.4 **A flow diagram illustrating properties of land as a production factor**

3.4.1 **Functions of land represented by**
A - Provision of mineral resources ✓
B - Food production/raw materials ✓
C - Space/area for production ✓
D - Space/area for capital wealth/human settlement/industry ✓

3.4.2 **Provisions a farmer can employ to improve land productivity**
- The use of scientific methods/technology/precision farming ✓
- Provision of water ✓
- Consolidating uneconomical farming units ✓
- Suitable crops/use for the land ✓

3.5 **List of activities on a farm**

3.5.1 **Casual labourer** - Construction of tunnels ✓
3.5.2 **Permanent labourer** - Cultivation of fields with a tractor ✓
3.5.3 **Seasonal labourer** - Wool shearing ✓

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Please turn over
3.6 TWO forms of credit and the purpose for usage

<table>
<thead>
<tr>
<th>FORMS OF CREDIT</th>
<th>PURPOSE FOR USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short term ✓</td>
<td>Production capital ✓</td>
</tr>
<tr>
<td>Medium term ✓</td>
<td>Equipment/livestock ✓</td>
</tr>
<tr>
<td>Long term ✓</td>
<td>(Any 2) Fixed assets/land ✓</td>
</tr>
</tbody>
</table>

Table with the correct information ✓ (5)

QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1 Representation of a cross between a black cow and a white bull

4.1.1 Identification of the genotype
   (a) Parent black cow - Bb ✓ (1)
   (b) Parent white bull - bb ✓ (1)

4.1.2 Determination of the $F_2$ offspring
   - Phenotype - white ✓ (1)

4.1.3 Punnet square

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<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>
```

1 mark for Punnett square with information ✓ (4)

4.2 Crossing of plants with red (R) flowers and plants with white (W) flowers

4.2.1 Indication of the parent with red flowers
   - Female ✓ (1)
   - Reason
     - RR is for red flowers/genotype is RR ✓ (1)

4.2.2 Determination of the phenotype as percentages in the $F_2$
   - 25% white ✓ (1)
   - 50% pink/white and red ✓ (1)
   - 25% red ✓ (1)

4.2.3 Identification the type of dominance indicated by this crossing
   Incomplete dominance/co-dominance ✓ (1)

4.2.4 Justification of the answer in QUESTION 4.2.3
   The offspring is neither white nor red/pink/intermediate colour/white and red ✓ (1)
4.3 Crossing parents with TWO characteristics

4.3.1 Identification of the crossing
Dihybrid cross ✓ (1)

4.3.2 Determination of characteristics received by each offspring
- Offspring 1 - Colour ✓ (1)
- Offspring 2 - Shape ✓ (1)
- Offspring 3 - Shape ✓ (1)

4.3.3 Indication of the dominant characteristics
- Square shape ✓
- White colour ✓ (2)

4.3.4 Indication of the percentage of genes received
50%/each received 50% genes from both parents ✓ (1)

4.4 A passage on GM's

4.4.1 Identification of the year Farmer B changed to GM crops
- 2012 ✓ (1)
  Reason
- Increase in production/from 10,6 - 12 started in 2012 ✓ (1)

4.4.2 ONE advantage that Farmer B got from using GM maize
Yields improved for 2012/improved progressively more from 2012 - 2015 ✓ (1)

4.4.3 THREE characteristics of GMO maize to Farmer B
- Resistance to herbicides ✓
- Not affected by insecticides ✓
- Crops have lower water requirements ✓
- Better adapted to the region ✓ (Any 3) (3)

4.4.4 Main reason for the resistance against the use GM's
- Health risks ✓
- Environmental risks ✓ (Any 1) (1)

4.5 Scenario on breeding system

4.5.1 Identification of the animal breeding system applied by Farmer B
- Crossbreeding ✓ (1)
  Reason
- Crossing of two different breeds ✓ (1)

4.5.2 TWO advantages of out crossing
- The least likely system to produce any problems ✓
- Offspring will carry the traits characteristics of both parents ✓
- Improve genetic diversity/new blood line is introduced ✓(Any 2) (2)
4.5.3 **TWO reasons why the old and non-fertile cows are sold**
- Reached the end of their production cycle/not productive ✓
- Efficiency by saving on nutrition ✓
- Improve the fertility of the herd ✓
- More economical for the farmer ✓

(Any 2) (2)

4.5.4 **Breeding system used by Farmer B with his own bulls**
Line/in breeding ✓

(1) [35]

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