AGRICULTURAL SCIENCES P2
FEBRUARY/MARCH 2015
MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.
### SECTION A

#### QUESTION 1.1

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.1.1</td>
<td>A ✓ ✓</td>
</tr>
<tr>
<td>1.1.2</td>
<td>B ✓ ✓</td>
</tr>
<tr>
<td>1.1.3</td>
<td>D ✓ ✓</td>
</tr>
<tr>
<td>1.1.4</td>
<td>C ✓ ✓</td>
</tr>
<tr>
<td>1.1.5</td>
<td>B ✓ ✓</td>
</tr>
<tr>
<td>1.1.6</td>
<td>D ✓ ✓</td>
</tr>
<tr>
<td>1.1.7</td>
<td>C ✓ ✓</td>
</tr>
<tr>
<td>1.1.8</td>
<td>A ✓ ✓</td>
</tr>
<tr>
<td>1.1.9</td>
<td>A ✓ ✓</td>
</tr>
<tr>
<td>1.1.10</td>
<td>D ✓ ✓</td>
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</table>

(10 x 2) (20)

#### QUESTION 1.2

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1.2.1</td>
<td>E ✓ ✓</td>
</tr>
<tr>
<td>1.2.2</td>
<td>D ✓ ✓</td>
</tr>
<tr>
<td>1.2.3</td>
<td>A ✓ ✓</td>
</tr>
<tr>
<td>1.2.4</td>
<td>G ✓ ✓</td>
</tr>
<tr>
<td>1.2.5</td>
<td>C ✓ ✓</td>
</tr>
</tbody>
</table>

(5 x 2) (10)

#### QUESTION 1.3

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1.3.1</td>
<td>Entrepreneurs ✓ ✓</td>
</tr>
<tr>
<td>1.3.2</td>
<td>Productivity/effectiveness ✓ ✓</td>
</tr>
<tr>
<td>1.3.3</td>
<td>Diversification ✓ ✓</td>
</tr>
<tr>
<td>1.3.4</td>
<td>Di-hybridism ✓ ✓</td>
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<tr>
<td>1.3.5</td>
<td>Genetic modification/ manipulation/engineering ✓ ✓</td>
</tr>
</tbody>
</table>

(5 x 2) (10)

#### QUESTION 1.4

<p>| | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1.4.1</td>
<td>Segmentation ✓</td>
</tr>
<tr>
<td>1.4.2</td>
<td>Marketing chain ✓</td>
</tr>
<tr>
<td>1.4.3</td>
<td>Perishability ✓</td>
</tr>
<tr>
<td>1.4.4</td>
<td>Depreciation ✓</td>
</tr>
<tr>
<td>1.4.5</td>
<td>Prepotency ✓</td>
</tr>
</tbody>
</table>

(5 x 1) (5)

TOTAL SECTION A: 45
SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

2.1 Marketing outlets

2.1.1 Marketing outlets illustrated in A and B
   A -Farm gate/stall✓
   B -Auction✓

2.1.2 The letter of the marketing outlet to which each of the following statements refer

(a) Products are sold at lower price
   A ✓

(b) It is easily accessible to small-scale farmers
   A ✓

(c) Price can be higher than expected
   B ✓

(d) Marketing costs are reduced
   A ✓

2.1.3 The marketing system represented by A and B
   • Free marketing✓
   Reason – Produce sold directly to consumers✓

2.2 Emerging farmer

2.2.1 TWO entrepreneurial skills
   • Innovative ✓
   • Creative ✓

2.2.2 Justification
   • Innovative: realisation of youth unemployment by the farmer/potential of the area to start a business✓
   • Creative – started a small scale factory✓

2.2.3 TWO possible advantages of securing a contract
   • Protection against price fluctuation✓
   • Guaranteed market✓
   • Eliminating/cutting out the middleman/intermediary/agent✓
   (Any 2)
2.2.4 Source identified by the farmer

(a) Availability of peaches/good supply of peaches ✓
(b) Unemployed youth ✓
(c) Adequate infrastructure ✓

2.2.5 Statement implying that the enterprise was a success

- Production rose from 100 bottles to 1500 bottles per day ✓
- Secured a contract with local wholesalers ✓ (Any 1)

2.3 Supply and demand of apples

2.3.1 Graph on the supply and demand of apples

![Graph showing supply and demand of apples.](image)

Criteria/rubric/markign guidelines

- Correct heading ✓
- X-axis – correct calibrations and labelled (Price) ✓
- Y-axis – correct calibrations and labelled (Quantity) ✓
- Units. (Rand and kg) ✓
- Accuracy/correct plotting ✓
- Line graph ✓ (6)

2.3.2 Equilibrium price of apples

- R14.00 ✓ (1)
2.3.3 Deduction on availability and price of apples
• Demand doubles at price R18.00: 580 x 2 = 1160
• Supply increases by 20%: \( \frac{20}{100} \times 950 = 190 \)
• \( 190 + 950 = 1140 \)
• There will be shortage of apples/demand outstrips supply
• The price will increase

2.4 Marketing channels.

2.4.1 Most sustainable market for the mutton from the list provided
• Large supermarket chains

2.4.2 TWO reasons to support answer in QUESTION 2.4.1
• Supply to large supermarkets is guaranteed
• There is more profit

2.4.3 Market that holds the highest security risk
• Local people who buy directly from the farm

2.4.4 Justification
• No guarantee of demand

QUESTION3: PRODUCTION FACTORS

3.1 Labour management

3.1.1 TWO Tasks per labour

(a) Permanent
• Inspection of watering points
• Feeding of stud rams
• Dosing of sheep
• Counting of sheep and records

(b) Temporary
• Shearing of sheep
• Upgrading of dams and watering troughs

3.1.2 ONE task that needs computer skills
• Feeding of stud rams
• Dosing of sheep
• Counting of sheep and records
3.1.3 The most non-repetitive task performed by the labourers
- Upgrading of dams and watering troughs

3.2 Labour contract

3.2.1 ONE statement addressing a Labour Act.

(a) Occupational Health and Safety
- Supply of protective clothing

(b) Basic Conditions of Employment Act.
- Working hours
- Conditions for termination
- Wages and salaries

(c) Labour Relations Act.
- Contributions towards Unemployment Insurance Fund/ UIF
- Affiliation to trade unions and right to strike

3.2.2 TWO benefits of UIF to farm workers
- Payment of farm workers when out of work
- Payment of female farm workers while on maternity leave

3.3 Land as a production factor

3.3.1 Economic characteristics
A – Agricultural land is limited

Justification
Good agricultural soil used for non-agricultural purposes

3.3.2 TWO ways through which the economic characteristic impacts on the productivity of the land
- Reduction of land due to the growing population
- Poses a pressure to produce more
- And that results to overutilization which in the long run will have a detrimental effect on productivity
3.3.3 **TWO ways to increase the productivity of land**
- Adapting to scientific methods
- Irrigation
- Consolidating uneconomic farm units  
  (Any 2)  (2)

3.4 **Capital as a production factor**

3.4.1

<table>
<thead>
<tr>
<th>Types of capital</th>
<th>Example</th>
<th>Source of capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td>Dam/irrigation system/land</td>
<td>Loan</td>
</tr>
<tr>
<td>Movable</td>
<td>Cattle/bakkies</td>
<td>Inheritance</td>
</tr>
</tbody>
</table>

- One mark for redrawing the table  (7)

3.4.2 **Problems associated with capital**

(a) **Buying three bakkies instead of one**  
Over-capitalisation  (1)

(b) **Loan through a financial institution which will be paid over a ten year period**
- High interest rate  (1)

(c) **Investing money on product which could be lost due to natural disasters**  
High risk factor  (1)

3.5 **Strategic farming management**

3.5.1 **Steps in strategic management**
- A - vision
- B - goal
- C - mission
- D - objective  (4)

3.5.2 **THREE benefits of the programme**
- Improved food security
- Improved welfare and livelihood/better living standards
- Skills development

3.5.3 **ONE skill to anticipate and deal with challenges**
- Problem solving skill  (1)
QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1 Genetic crossing

4.1.1 The genetic crossing

\[
\begin{array}{c|c|c|c|c}
R & r & r & r & r \\
\hline
R & Rr & Rr & Rr & Rr \\
\hline
\end{array}
\]

or

\[
\begin{array}{c|c|c|c|c}
♂ & ♀ & r & r & r \\
\hline
r & R & Rr & Rr & Rr \\
\hline
\end{array}
\]

4.1.2 Calculate the percentage of the black offspring

\[
\frac{4 \times 100}{4} = 100\%
\]

4.1.3 The number of the offspring with a homozygous gene pair

\[0/\text{zero}/\text{nil}/\text{none}\]

4.1.4 Probability to have a red calf

\[RR\]

4.2 Estimated Breeding Value (EBV)

4.2.1 Calculation of EBV/ the genetic gain

\[
\text{EBV} = (\text{Animal Weight} - \text{Average Herd Weight}) \times \text{heritability}
\]

\[
52.5 \text{ kg} - 47.5 \text{ kg} = 5.0 \text{ kg}
\]

\[
5.0 \text{ kg} \times \frac{85}{100} = 4.3 \text{ kg}
\]

\[
\text{EBV} = +4.3 \text{ kg or 4.3 kg}
\]
4.2.2 The implication of the value
• Offspring will have a slaughter weight of 51,8 kg
• The offspring will be 4,3 kg heavier than the flock average

4.3 Plant improvement
4.3.1 Identification of the process illustrated above
• Genetic modification/GM/manipulation/engineering

4.3.2 TWO main potential risks of GMO
• Food safety
• Environmental issues
• Socio-economic effects
(Any 2)

4.3.3 The organism labelled C
Transgenic/GMO

4.3.4 THREE Characteristics of genetically modified crop
• Herbicide resistance
• Insect resistance
• Resistance to harsh environmental conditions
• Improved nutritional value/starch/vitamins
• Modified/improved quality
(Any 3)

4.4 Variation
4.4.1 Importance of variation
• Brings about new cultivars
• with improved characteristics

4.4.2 TWO genetic causes of variation
• Mutation
• Recombination of genes
• Crossing over of chromosomes/meiosis
(Any 2)

4.4.3 Types of variation
• Continuous variation - complete range of characteristics from one extreme to another
• Discontinuous variation - has a few clear-cut or distinct forms with no intermediate forms in between

4.4.4 Selection
• Process of choosing individuals
• with desirable characteristics for breeding purpose
4.5 Animal breeding

4.5.1 Identification of the breeding method
- Crossbreeding ✓

4.5.2 THREE benefits to farmer B
- New breeds developed ✓
- Animals will adapt better in varying conditions/better vitality ✓
- Animals will be more resistant to diseases ✓
- High mass gain in relation to food intake ✓
- Leads to heterosis/hybrid vigour ✓

(Any 3)

4.5.3 A possible advantage of this breeding method to Farmer A
- Making money by selling bulls/sells to farmer B ✓

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150