NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2014

MEMORANDUM

MARKS: 150

This memorandum consists of 11 pages.
## SECTION A:

### QUESTION 1

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

(10 x 2)  (20)

1.2
- 1.2.1 G ✓✓
- 1.2.2 J ✓✓
- 1.2.3 H ✓✓
- 1.2.4 B ✓✓
- 1.2.5 F ✓✓

(5 x 2)  (10)

1.3
- 1.3.1 Budget ✓✓
- 1.3.2 Collateral/fixed asset ✓✓
- 1.3.3 Risk ✓✓
- 1.3.4 Genetic modification(GM)/engineering/biotechnology ✓✓
- 1.3.5 Quantitative ✓✓

(5 x 2)  (10)

1.4
- 1.4.1 Co-operative/pool ✓
- 1.4.2 Bartering ✓
- 1.4.3 Entrepreneur ✓
- 1.4.4 Depreciation ✓
- 1.4.5 Variation/biometrics/EBV ✓

(5 x 1)  (5)

**TOTAL SECTION A:** 45
SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

2.1 The price and the quantity of lambs sold by a farmer over a period of six months

2.1.1 Line graph showing the relationship between the number of lambs sold and the months of the year

![Graph showing relationship between number of lambs sold and months](image)

**Criteria/rubric/marketing guidelines**
- Correct heading ✓
- Y-axis –Correct labelled (Number of lambs) ✓
- X-axis –Correct labelled (Sept. - Feb.) ✓
- Correct calibrations of X and Y axe ✓
- Accuracy ✓
- Line graph ✓ (6)

2.1.2 Month with the highest income
- November ✓ ✓ (2)

2.1.3 Marketing strategy
- Use of a breeding season/planning for marketing stage ✓
- Supply most of their animals during the festive season/December ✓
- Promotion/advertising/market research ✓
- Market animals when the price is the highest ✓ (Any 1) (1)

2.1.4 Calculation of the price per lamb for

(a) **October**: 27kg x R81/kg ✓
   = R2 187 ✓ (2)

(b) **December**: 27kg x R110/kg ✓
   = R2 970 ✓ (2)
2.1.5 Economic reason for a decrease in supply
- Drop in price in January for lambs ✓
- Biggest demand is over/festive season is over/ withholding stock/speculating for a higher price ✓
- Scarcity of money after the festive season ✓
- The farmer ran out of stock/no stock available ✓ (Any 1) (1)

2.2 Marketing strategies

2.2.1 Marketing system for group 2
Free marketing/direct system ✓ (1)

2.2.2 TWO reasons to justification the choice in Question 2.2.1
- Sold vegetables from door to door/sell at any place/ no middleman ✓
- Individuals responsible for their own marketing ✓
- Sell at their own price ✓ (Any 2) (2)

2.2.3 Group's marketing strategy
(a) Group 1 ✓ (1)
(b) Group 2 ✓ (1)

2.2.4 Reason for a pool marketing system
- Sold at a fixed price/price control ✓
- Vegetables were combined/stockpile ✓ (Any 1) (1)

2.3 Diagram of the marketing procedures for an agricultural product.

2.3.1 Identification of marketing function
A: Distribution/transport/delivery ✓
B: Processing/value adding ✓
C: Packaging ✓ (3)

2.3.2 Differentiation of the price of Product:
A - Raw product with a lower price ✓
D - Processed product with a higher price ✓ (2)

2.3.3 TWO aspects of a SWOT analysis
- Strengths ✓
- Weaknesses ✓
- Opportunities ✓
- Threats ✓ (Any 2) (2)
2.3.4 **TWO aspect to be included in feasibility study**
- Demand for the final product/market research ✓
- Availability of skilled labour ✓
- Capital investment needed/availability of capital ✓
- Support structures needed/resources/storage facilities ✓
- Distance to/from markets/accessibility ✓
- Operation of plant during the off season ✓
- Profitability ✓
- SWOT analysis ✓ (Any 2) (2)

2.4 **Activities related to the production and marketing of agricultural product**

2.4.1 **THREE activities in the following order:**
- Planning for production ✓
- Soil preparation and planting ✓
- Grading ✓
- Storage ✓
- Distribution ✓
- Sales to consumers ✓ (Any 3 in a CORRECT ORDER) (3)

2.4.2 **TWO problems with the distribution during marketing of agricultural products**
- Poor infrastructure/bad roads ✓
- Transportation/wide distribution and distances to markets ✓
- Accidents/theft can cause losses ✓
- High transportation cost ✓
- Spoilage of products in the market chain/perishability ✓
- Products not properly handled/stored ✓ (Any 2) (2)

2.4.3 **Activities related to the standardisation of agricultural products**
- Grading ✓  (1)

[35]
QUESTION 3: PRODUCTION FACTORS

3.1 Contract between an employer and an employee

3.1.1 Type of worker signing a contract
- Permanent/fixed/full time worker ✓ (1)

Justification with reason
- Long term employment/1 February 2011 - retirement ✓ ✓ (Any 1) (2)
- Entitled to some benefits, e.g. annual leave ✓ ✓

3.1.2 Labour legislation
(a) Basic Conditions of Employment Act. (Act Number 75 of 1997)
- Duration of contract: 01 February 2011 - retirement or till the contract ends ✓
- Remuneration/Amount ✓
- Terms of employment/leave/working hours: ✓ (Any 1) (1)

(b) Occupational, Health and Safety Act. (Act 85 of 1993)
- Protective clothing: ✓ (1)

3.1.3 Aspect that contributes to scarcity of labour:
- Remuneration of R2 500 ✓
- The industry pay more for skilled labour ✓
- Working hours from 06h00 to 17h00 ✓
- Industry is shorter working hours ✓
- Leave: One week paid leave per annum ✓
- Longer/paid leave period is given to workers in industry ✓
- Protective clothing: None ✓
- Dangerous working conditions ✓ (2)

3.1.4 HIV impact on the productivity of a farming business
- Worker would be sick and absent from work ✓
- Lower productivity/worker will work slowly/shorter hours ✓
- Labour shortages/difficult to complete tasks ✓
- Extra financial/cost burden/support on the farmer ✓
- Planning/running the farm becomes more difficult ✓
- Loss of skills/experience ✓ (Any 2) (2)
3.2  Diagram representing capital forms

3.2.1  Types of capital represented by:

- **A** - movable capital ✓
- **C** - fixed/immovable/movable capital ✓ (2)

3.2.2  **TWO examples of floating capital in the farming operation**

- Feeds ✓
- Medication/chemicals ✓
- Cleaning/sanitation substances ✓
- Electricity ✓
- Fuel ✓
- Wages/salaries/cash ✓
- Fertilisers/manure ✓
- Stationery ✓
- Seeds ✓ (Any 2) (2)

3.3  Information on assets and liabilities on a farm

3.3.1  **Table and calculation of the net worth of the farm**

<table>
<thead>
<tr>
<th>✓</th>
<th>Assets</th>
<th>Rand</th>
<th>Liabilities</th>
<th>Rand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Farm</td>
<td>3 500 000</td>
<td>Tractor loan</td>
<td>365 000</td>
</tr>
<tr>
<td></td>
<td>Vehicles</td>
<td>275 000  ✓</td>
<td>Overdraft</td>
<td>150 000 ✓</td>
</tr>
<tr>
<td></td>
<td>Cash</td>
<td>50 000  ✓</td>
<td>Bond</td>
<td>4 200 000</td>
</tr>
<tr>
<td></td>
<td>Buildings</td>
<td>650 000  ✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>Total</td>
<td>4 475 000 ✓</td>
<td>Total</td>
<td>4 715 000 ✓</td>
</tr>
<tr>
<td></td>
<td>Net worth</td>
<td>R 4 475 000 – R 4 715 000 = R – 240 000 or (R240 000 deficit) ✓ ✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mark allocation/markign guidelines/rubric:**
- Redrawing the table with the correct headings
- Assets sorted correctly
- Total of assets
- Liabilities sorted correctly
- Total of liabilities
- Net worth (7)

3.3.2  **Viability of the farming business**

- Not viable ✓ (1)
- **Justification with reason**
  - Loss/deficit of – R240 000/insolvent/bankrupt/liabilities are greater than the assets ✓ (1)
3.4 Fertilizer applied and the quantity of potato produced on piece of land

3.4.1 Economic characteristic shown by the data in the table
- The law of diminishing returns ✓

3.4.2 Relationship between fertilizer input and yield
- Potato yield will increase with an increase in fertiliser input until optimum production is reached ✓
- A further increase in fertiliser input result in a decreasing increase of potato yield ✓
- After that production of potatoes will stabilise/remain constant ✓

3.4.3 TWO measures a farmer can employ to the land in order to be more productive
- Scientific/precision farming methods/fertiliser/manure/crop rotation ✓
- Consolidation of small/uneconomic units ✓
- Restoring land potential/resting the land/correct land utilisation ✓
- Responsible application chemicals/pesticides/herbicides ✓
- Irrigation/permanent water supply ✓

3.5 Passage on managerial principles

3.5.1 TWO managerial principles
- Planning ✓
- Organization/co-ordination ✓
- Decision making ✓
- Control ✓
- Motivation ✓
- Communication ✓
- Leading and direction ✓
- Monitoring ✓
- Implementation ✓ (Any 2)

3.5.2 TWO external forces
- Legal/legislation/politics ✓
- Economic/marketing environment ✓
- Capital /funding ✓ (Any 2)

3.5.3 Types of essential farm records
(a) List/record ✓ of assets/all the machinery/equipment/livestock/other moveable items on the farm ✓
(b) A record of all the breeding stock ✓ that is used in a particular breeding program and their activities ✓
QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1 Dihybrid crossing on horns and hair colour

4.1.1 The genotype of individual number 11 and 14
(a) 11 - aaBB ✓ (1)
(b) 14 - Aabb ✓ (1)

4.1.2 The phenotype of individual number 6 and 12
(a) 6 - Red and polled/no horns ✓ (1)
(b) 12 - Black and horned ✓ (1)

4.1.3 Phenotype of the offspring between number 6 and 16:

<table>
<thead>
<tr>
<th></th>
<th>Ab</th>
<th>Ab</th>
</tr>
</thead>
<tbody>
<tr>
<td>ab</td>
<td>Aabb</td>
<td>Aabb ✓</td>
</tr>
<tr>
<td>✓ ab</td>
<td>Aabb</td>
<td>Aabb</td>
</tr>
</tbody>
</table>

Mark allocation/marketing guidelines/rubric
- Punnett square
- Parent 1 gametes
- Parent 2 gametes
- Genotype of offspring (4)

4.1.4 Phenotype of the crossing in QUESTION 4.1.3
- Red and polled/no horns ✓ (1)

4.2 Breeding systems and technologies

4.2.1 The breeding methods:
A. Upgrading ✓
B. Inbreeding ✓
C. Crossbreeding ✓ (3)

4.2.2 Breeding method for heterosis
C/A ✓ (1)

4.2.3 TWO disadvantages of inbreeding
- Loss of vigour/performance/inbreed depression ✓
- Loss of fertility ✓
- Smaller genetic variation ✓
- Increase of lethal genes which can result in death ✓
- Reduced vitality ✓
- Fixation of undesired genes ✓
- Expert knowledge required ✓
- Less resistance to diseases ✓
- Poorly adapted to the environment ✓
- Deformed animals ✓
(Any 2) (2)

4.2.4 Change the enterprise from Brahman to a Bonsmara
Upgrading/A ✓ (1)
Nguni cattle with a distinct colour pattern

4.3.1 Identify this type/mechanism of heredity
  • Co-dominance ✓ (1)

4.3.2 Explanation of colour combination
  • Both white and red hair fibres are present ✓
  • The offspring has the phenotype of both parents ✓
  • No intermediate/mixture of colour is formed ✓ (Any 2) (2)

4.3.3 Difference between incomplete and co-dominance
  • Incomplete dominance
    Offspring has a phenotype that is in-between those of the parents ✓
  • Co-dominance
    Offspring has the phenotype/colour of both parents ✓ (2)

4.4 Techniques to change DNA of tomato plant

4.4.1 TWO other methods
  • Micro-injection ✓
  • Gene gun/biolistic ✓
  • Agro-bacterium tumefaciens ✓
  • Electroporation ✓
  • Recombination DNA ✓
  • Calcium phosphate precipitation ✓
  • Gene silencing ✓
  • Gene splicing ✓
  • Lipofection ✓ (Any 2) (2)

4.4.2 TWO disadvantages of DNA modified tomatoes
  • Health concerns/allergies ✓
  • Not enough research has been done ✓
  • Expensive ✓
  • Super weeds develop from tomato pollen ✓
  • Religious beliefs ✓ (Any 2) (2)

4.5 Differences between continuous and discontinuous variation

Continuous variation
  • There is a complete range of characteristics from one extreme to another ✓

Discontinuous variation
  • Characteristics have a few clear-cut forms/no intermediate forms in between ✓ (2)
4.6  **Traditional selection method**

4.6.1 **Define selection**
- Process of choosing/identifying specific individuals ✓
- For their desired characteristics/traits ✓
- To be used in the production of quality offspring ✓ (Any 2) (2)

4.6.2 **Method of selection in the scenario.**
- Mass selection ✓ (1)

4.6.3 **THREE characteristic considered for selection**
- Growth ✓
- Health ✓
- Fertility ✓ (3)

4.6.4 **Aspects to improve phenotype of animals**
(a) **Best** bulls for growth/health/fertility were shared ✓ (1)
(b) Utilizing the best available pastures/keeping them away from wet/muddy areas ✓ (1) [35]

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