AGRICULTURAL SCIENCES P2
NOVEMBER 2015
MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.
SECTION A

QUESTION 1

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

     (10 x 2) (20)

1.2 1.2.1 D ✓ ✓
     1.2.2 G ✓ ✓
     1.2.3 F ✓ ✓
     1.2.4 C ✓ ✓
     1.2.5 E ✓ ✓

     (5 x 2) (10)

1.3 1.3.1 Planning ✓ ✓
     1.3.2 Advertising/marketing/promotion ✓ ✓
     1.3.3 Income statement ✓ ✓
     1.3.4 Inbreeding depression ✓ ✓
     1.3.5 Homozygosity ✓ ✓

     (5 x 2) (10)

1.4 1.4.1 Demand ✓
     1.4.2 Productivity ✓
     1.4.3 Working/floating ✓
     1.4.4 Conceptual/business/entrepreneurial/adaptability ✓
     1.4.5 Atavism ✓

     (5 x 1) (5)

TOTAL SECTION A: 45
SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

2.1 Marketing of agricultural produce

2.1.1 Type of marketing
Free marketing ✓

2.1.2 Reason for the type of marketing in QUESTION 2.1.1
- Produce sold anywhere✓/produce is directly sold to consumers ✓
- Direct contact ✓ between producer and consumer ✓ (Any 1)

2.1.3 Channel illustrated
Direct to consumers/public ✓

2.1.4 TWO advantages of channel to consumers
- Consumers can compare/negotiate the price ✓
- Consumers pay less/no expenditure to intermediaries ✓
- Consumer confidence/get higher quality ✓ (Any 2)

2.1.5 THREE problems that may hamper free marketing
- Perishability ✓
- Competition ✓
- Seasonal fluctuation ✓
- Diversity in production ✓
- Safety/security of the producer ✓
- Risk/quantity of consumers ✓ (Any 3)

2.2 Demand and supply

2.2.1 Relationship between price, supply and demand
- The higher the price ✓, the higher the supply ✓ and the lesser the demand ✓
  
  OR

- The lesser the price ✓, the lesser the supply ✓ and the higher the demand ✓
2.2.2 Graph on the supply and demand of oranges

Criteria/rubric/marking guidelines
- Correct heading ✓
- X axis - correctly calibrated and labelled (Quantity of oranges) ✓
- Y axis - correctly calibrated and labelled (Price) ✓
- Correct units (Rand and pockets) ✓
- Accuracy for both graph for demand ✓
- Line graph for supply and demand ✓ (6)

2.2.3 Reason for higher demand
- Price for pocket of oranges was low (R10) in week 1 ✓
- but higher (R30) in week 5 ✓ (2)

2.3 THREE problems encountered when drawing up a business plan
- Insufficient research/lack of knowledge ✓
- Leaving gaps, being vague or providing too much information ✓
- Insufficient technical detail ✓
- Unrealistic assumptions and projections ✓
- Using incorrect format ✓
- Hiding weaknesses and risks ✓
- Too generic ✓
- Not authentic ✓
- Not highlighting potential competition ✓
- Budget/cash flow errors/Calculation errors/incomplete financial data ✓
- Incompetency ✓ (Any 3) (3)
2.4 **Marketing legislation**

2.4.1 Agricultural Product Standards Act (No. 119 of 1990) ✓
2.4.2 Meat Safety Act (No. 40 of 2000) ✓
2.4.3 Consumer Protection Act (No. 68 of 2008) ✓
2.4.4 Perishable Products Export Control Act (No.9 of 1983) ✓

2.5 **Entrepreneurial qualities**

2.5.1 **FOUR entrepreneurial qualities**
- Creativity ✓
- Innovation ✓
- Risk taking ✓
- Leadership ✓
- Hard working ✓
- Perseverance ✓

(Any 4) (4)

2.5.2 **Explanation of entrepreneurial qualities**
- Creativity - starting a cooking and catering business ✓
- Innovation - use of available human/financial resource/learners/ catering for the community activities ✓
- Risk taking - using donation money to start a new business/Start business with few learners ✓
- Leadership - leading a group of learners/the business grew into a training centre ✓
- Hard working - starting/managing a successful business in only two years ✓
- Perseverance - starting/managing a successful business in only two years ✓

(Any 4) (4) [35]
QUESTION 3: PRODUCTION FACTORS

3.1 Farm labour

3.1.1 Types of labour
A - Permanent/full time/skilled/semi-skilled ✓
B - Seasonal/temporary/skilled/semi-skilled ✓

3.1.2 Justification for QUESTION 3.1.1
A - Task done on regular and repetitive basis/trained ✓
B - Task done seasonally/trained ✓

3.1.3 Challenges causing permanent labour to leave the agricultural
- Low wages/search for better wages/opportunities ✓
- Competition ✓
- Lack of training ✓
- Long working hours ✓
- Ill-health/non-conducive/unfavourable working conditions ✓
(Any 2) (2)

3.1.4 Addressing challenges associated with permanent labour
- Improve on labour utilisation ✓
- Improve economic conditions of labourers ✓
- Ensure that labourers are trained ✓
- Adherence to basic conditions of service ✓
- Provision of health education ✓
- Giving praise and recognition to labourers/motivation ✓
- Provision of appropriate tools/equipment/cloths for the job ✓
(Any 2) (2)

3.1.5 Legislation regulating safety
Occupational Health and Safety Act (No.85 of 1993) ✓ (1)

3.1.6 Types capital in the photograph A
- Fixed capital ✓
- Movable capital ✓
- Floating/working capital ✓
(Any 2) (2)

3.2 Land as a production factor

3.2.1 Economic characteristics
(a) Agricultural land is limited/has economic value/urban development affects availability ✓
(b) Land is subject to the law of diminishing return ✓
(c) Land is durable/indestructible ✓
(d) Land is indestructible/of a permanent nature/production capacity varies ✓ (4)
3.2.2 **TWO ways of improving productivity of land**
- Adapting to scientific methods/technology of production/changing cropping/animal practices ✓
- Infrastructure ✓
- Diversification ✓
- Water provision/irrigation ✓
- Consolidation of uneconomic units ✓
- Ensuring that the type of farming is suitable to the area ✓
- Education/training ✓

(Any 2) (2)

3.3 **Market risk**

3.3.1 **External force leading to the situation**
- Competition ✓ (1)

3.3.2 **Type of risk encountered by the manager**
- Market/price/financial risk ✓ (1)

3.3.3 **Motivation of market risk**
- Increase in the supply of the product ✓
- resulted in a price decrease ✓ (2)

3.3.4 **TWO risk management strategies**
- Future contract/hedging ✓
- Value adding/processing ✓
- Flexibility ✓
- Good understanding of past price trends ✓
- Diversification/specialisation ✓
- Effective control ✓

(Any 2) (2)

3.3.5 **TWO components of management**
- Planning/setting goals ✓
- Implementation/coordinating ✓
- Control ✓
- Decision making ✓
- Organisation ✓

(Any 2) (2)

3.4 **Capital items and costs**

3.4.1 **Classification of items**

(a) Income - Cattle sales ✓, sheep sale ✓ (2)

(b) Variable costs - Marketing ✓, grain feed ✓, electricity telephone bills ✓ (Any 2)

(c) Overhead costs - Telephone bills ✓, electricity ✓ (2)
3.4.2 Calculation of net income with the formula

Income = R110 500 + R80 900 = R191 400 ✓
Expenditure = R42 350 + R22 500 + R20 000 + R12 500
= R97 350 ✓
Net income = Income – expenditure ✓
= R191 400 ✓ – R 97 350 ✓
= R 94 050 ✓

OR

Net income = Income – expenditure ✓
= R191 400 ✓ – R 97 350 ✓
= R 94 050 ✓

QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1 Crossing between a brown ewe and white ram

4.1.1 Phenotype of parents
P1
- Brown coloured ewe ✓
- White coloured ram ✓
OR
P2
- Brown coloured ewe ✓
- Brown/white coloured ram ✓

(Any 1) (2)

4.1.2 Genotype of parents
P1
- Ewe - AA ✓
- Ram - aa ✓
OR
P2
- Ewe - Aa ✓
- Ram - Aa/aa ✓

(Any 1) (2)

4.1.3 Type of dominance
Complete dominance ✓

(1)

4.1.4 Motivation
- Brown colour is dominant over the white colour ✓✓
- No intermediate colour ✓✓

(Any 1) (2)
4.1.5

Marking criteria

Male gametes ✓
Female gametes ✓
Offspring ✓
Punnet square ✓ (4)

4.2 Breeding system

4.2.1 Type of breeding system

Upgrading ✓ (1)

4.2.2 TWO disadvantages of upgrading

- Time consuming ✓
- Bulls must always be bought from outside to reduce inbreeding/it is expensive ✓
- The commercial value of the first few generation is low ✓
- The offspring can never be bred 100% pure ✓ (Any 2) (2)

4.2.3 Determination of the number of crossings

5 crosses ✓ (1)

4.2.4 Calculation of the percentage characteristic

- Cow: $\frac{1}{2} \times 75\% = 37.5\%$ ✓
- Bull: $\frac{1}{2} \times 100\% = 50\%$ ✓
- $37.5\% + 50\%$ ✓
- $= 87.5\%$ ✓

OR

- $\frac{1}{2} \times (75\% \checkmark + 100\% \checkmark)$
- $= 87.5\%$ ✓

OR

- $(75\% \checkmark + 100\% \checkmark) \div 2$ ✓
- $= 87.5\%$ ✓ (4)
4.3 Heritability of the characteristics in sheep

4.3.1 Determination of the EBV for birth weight

\[ \text{EBV} = (\text{Lamb weight} - \text{average weight}) \times \% \text{ heritability} \]

\[ = (3\text{kg} - 1.8\text{kg}) \times 60\% \]

\[ = 0.72 \] (3)

4.3.2 Implication of the calculated value

- The offspring will be 0.72kg heavier ✓ than the average flock ✓
- The average flock will be 0.72kg smaller ✓ than the offspring of the lamb ✓
- An increase in birth weight ✓ above the average of the flock by 0.72kg ✓

(Any 1) (2)

4.3.3 Heritability of the fleece weight

50% ✓ (1)

4.3.4 TWO reasons the post-weaning weight gain cannot be recommended for breeding purposes

- Environment has a huge influence in the outcome of the characteristics ✓
- Low heritability/33% heritable ✓

(Any 1) (2)

4.4 Genetic modification of lettuce

4.4.1 Difference in yield of GM lettuce and non-GM lettuce

GM lettuce produce better under different conditions ✓ than non-GM plants under the same conditions ✓

(2)

4.4.2 One advantage of GM lettuce in both conditions

Higher yield/ produce better ✓

(1)

4.4.3 Benefits of genetic engineering over traditional methods

- Precise/desired genes are transferred ✓
- Not limited to crossing of the same species ✓
- More convenient ✓
- Faster/requires only one generation to complete ✓
- More resistant to pests/drought/diseases/herbicides ✓
- Higher yields ✓

(Any 3) (3)

4.4.4 TWO environmental risks of genetically modified plants

- Creation of herbicide resistant 'superweeds'/harmful pesticide resistant plants ✓
- Indiscriminate use of herbicides pollute the environment ✓
- Beneficial insects can be killed ✓

(Any 2) (2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150