



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2015

AGRICULTURAL SCIENCES: PAPER II

MARKING GUIDELINES

Time: 2½ hours

150 marks

These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.

SECTION A

QUESTION 1

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

(20)

1.2.1	D
1.2.2	A
1.2.3	J
1.2.4	C
1.2.5	E

(10)

1.3.1	Homozygous
1.3.2	Genetic modification/engineering/manipulation
1.3.3	Co-operative/pool system
1.3.4	Risk
1.3.5	Budget

(10)

1.4.1	Variation/biometrics/EBV
1.4.2	Pool
1.4.3	Capital
1.4.4	Dominant
1.4.5	Strategic/visionary

(5)

45 marks

SECTION B**QUESTION 2 AGRICULTURAL MANAGEMENT AND MARKETING****2.1 Khakibos production****2.1.1 Reasons for profitable Khakibos production**

- Herb produces essential oils that are in demand
- The production started slowly, but in 1995 it was exported to Europe
- Value adding is a sign of an enterprise that is booming
- There is lower security risk

(Any 3) (3)

2.1.2 Requirements for setting prices

- Determine the cost incurred in the product
- Competition orientated or going rate/price
- Market orientated pricing/demand and supply on the market
- Quality of the product
- Value-adding or processing of the product

(Any 3) (3)

2.1.3 Business strategies

- Value adding/processing
- Diversification
- Specialisation

(Any 2) (2)

2.1.4 Value adding methods

- Distillation
- Refrigeration/freezing
- Packaging the product in polystyrene containers

(Any 2) (2)

2.2 Supply and demand

2.2.1 R20,00

(1)

2.2.2 Motivation

- The quantities supplied will increase from A (200) to B (400)
- The equilibrium price will decrease
- Lower prices due to a larger supply resulting in higher demand

(3)

2.2.3 Inelasticity of supply

- Producers cannot increase production quickly
- Even if the prices increase due to biological or seasonal nature
- Production takes time and crops need to ripen

(Any 2) (2)

2.2.4 Processing stabilising income

- The products can be stored for a longer period
- The producer can sell modified (value-added) products for a higher price/products gain value (higher price)
- It is not limited to season/no limitations
- More income for the farmer
- The market for the product is enlarged
- Products are mostly preserved/longer shelf life
- Fewer products will perish, which will increase income

(Any 3) (3)

2.3 Steps in decision-making**2.3.1 Steps in correct order**

- Identify the problem with regard to its importance
- Analyse possible alternatives
- Evaluate alternatives
- Choose and follow the best solution

(4)

2.3.2 TWO factors influencing effective decision-making

- Speed with which decisions are taken or timing of the decision
- The degree of accuracy with which the decisions are taken or made
- The acceptability of the decision
- Business sense
- Social views or ethics
- Economics
- Profitability
- Environmental sustainability

(Any 2) (2)

2.4 Route of meat from the farm to the consumer

2.4.1 (a) Consumer price
 $= R30,00 + R2,00 + R14,50$
 $= R46,50$

(2)

(b) Percentage of profit
 $= [(R14,50 - R5,00)/R14,50] \times 100$
 $= [R9,50/R14,50] \times 100$
 $= 65,5 \%$

(3)

2.4.2 (a) Abattoir/butchery

(1)

(b) Butchery

(1)

(c) Farmer

(1)

2.4.3 Agri-business chain marketing channel or Supply chain

(1)

2.4.4 Disadvantages

- Costs are added to the raw product
- Product cannot be bought directly from the producer

(Any 1) (1)

[35]

QUESTION 3 PRODUCTION FACTORS

3.1 Fertiliser applied and the quantity of potato produced on piece of land

3.1.1 Economic characteristic

- The law of diminishing returns (1)

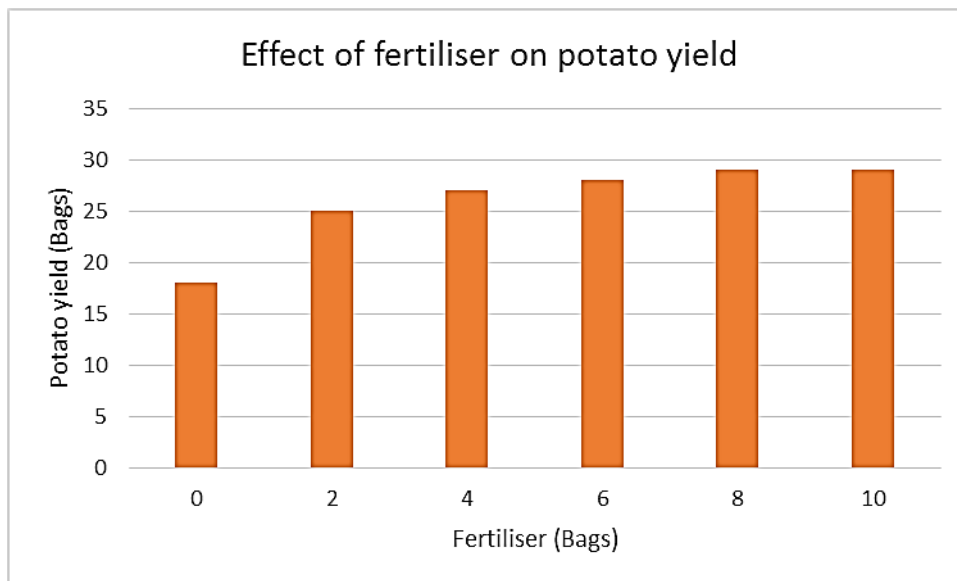
3.1.2 Relationship

- 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 rate of increase in potato yield
- After that the production of potatoes will stabilise or remain constant (Any 2) (2)

3.1.3 TWO main measures

- Scientific or precision farming methods or fertiliser or manure or correct cultivation methods or crop rotation
- Consolidation of small or uneconomical units
- Restoring land potential or resting the land or correct land utilisation
- Responsible application of chemicals or pesticides or herbicides
- Irrigation or permanent water supply (Any 2) (2)

3.1.4 Bar graph



Bar graph check list

Evidence	Yes	No
Heading	1	0
X-axis labelled (Fertiliser (Bags))	1	0
Y-axis labelled (Potato yield (Bags))	1	0
Correct value	1	0
Bar graph: Potato yield	1	0

(5)

3.2 HIV/Aids

3.2.1 HIV/Aids implications

The productivity will decrease because experience and knowledge are lost with ultimate loss of skilled labour and agricultural production (3)

3.2.2 FOUR actions

- HIV/Aids awareness campaigns
- Access to condoms
- Access to treatment for sexually transmitted infections
- Access to anti-retroviral drugs
- Education on morally acceptable behaviour
- Testing to determine status

(Any 4) (4)

3.3 Managerial planning

3.3.1 (a) Daily activities

- Prepare broiler house number 3
- Remove old bedding
- Observe cattle
- Filled water troughs
- Feeding activities

(Any 1) (1)

(b) Seasonal activities

- Harvesting sunflowers
- Weaning
- Branding

(Any 1) (1)

3.3.2 (a) Seasonal labourers/Temporary labourers (1)

(b) Permanent labourers (1)

3.3.3 Paint workshop

Once this job or work is just completed, the labourers leave the farm or employment (2)

3.3.4 Difference between assets

Fixed	Movable	Working
Assets that are durable, that can be used for a period of over ten years Examples: land, house 1, 2 & 3, workshop, handling facilities (Any 1)	Assets that have a life span of fewer than ten years Examples: harvester, tractor, trailer, cattle, calves, horses (Any 1)	Assets with a life span of a period of less than two years Examples: loose hand tools, paint, branding equipment, remedies, feeds (Any 1)

(6)

3.4 **Assets and liabilities of the farm**

Assets	Rand	Liabilities	Rand
Farm	R3 500 000	Tractor loan	R365 000
Cash	R50 000	Overdraft	R150 000
Buildings	R650 000	Bond	R4 200 000
Vehicles	R275 000		
Total	R4 475 000	Total	R4 715 000
Net worth	-R240 000 or (R240 000 deficit)		

Mark allocation/marking guideline/rubric:

Redrawing the table with the correct headings

Assets sorted correctly

Total of assets

Liabilities sorted correctly

Total of liabilities

Net worth

(6)
[35]

QUESTION 4 BASIC AGRICULTURAL GENETICS

4.1 Dihybrid crossing

4.1.1 Genotypes

(a) AABb (1)

(b) aaBb (1)

4.1.2 Phenotypes

(a) Polled red animal (1)

(b) Horned black animal (1)

4.1.3

	Ab	Ab
aB	AaBb	AaBb
aB	AaBb	AaBb

Mark allocation/marking guidelines/rubric

Punnett square

Parent 1 gametes

Parent 2 gametes

Genotype of offspring (4)

4.1.4 Phenotype of offspring

Polled or no horns and black coat (1)

4.2 Breeding systems in cattle

4.2.1 A – Upgrading

B – Line breeding/inbreeding

C – Cross-breeding (3)

4.2.2 B (1)

4.2.3 Disadvantages

- Loss of vigour/performance/inbreeding 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
- Mutations
- Animals get smaller

(Any 3) (3)

4.2.4 Alternative breeds

- (i) Ayrshire
- (ii) Afrikaner/Boran
- (iii) Angus/Sussex/Braunvieh/Pinzgauer/Hereford (any *Bos taurus* breed) (3)

4.3 Genetic modification

4.3.1 Process of developing GMO

- Done by adding, altering, taking away genes or specific parts of genes
- The isolation, manipulation or reintroduction of DNA cells
- To produce a more desirable phenotype

NB Not simply crossbreeding – done across species

(Any 2) (2)

4.3.2 Advantages of GMO

- More productive
- Higher production
- Resistant to pests/diseases/herbicides/pesticides
- Longer shelf life
- More tolerant to cold/salinity/droughts
- Better flowering/colour/texture/nutritional value
- Cheaper/more plentiful food provision

(Any 3) (3)

4.3.3 Disadvantages of GMO

- Shift from agriculture to biotechnology
- GM foods may pose long-term health risks
- May lead to lower yields to and lower profitability for farmers
- Some GM crops may be toxic to plant eating insects
- Likelihood of reducing biodiversity of crop land
- May cause allergic reactions when eaten

(Any 2) (2)

4.3.4 Hybridisation

- A lot of expertise/knowledge is required to prevent cross pollination
- Each flower needs special attention

(2)

4.4 Heritability characteristics

4.4.1 Most effective characteristic

Post-weaning gain

- 60% or the highest heritability, meaning that the characteristics is more likely to be transferred to its offspring or more genetically influenced than environmentally

(2)

4.4.2 Fleece quality

Not very effective

It has a 17% heritability or the lowest heritability, meaning it is more influenced by the environment/other factors than by the genes

(2)

4.4.3 $EBV = (WA - WH) \times \text{heritability of wool production}$

WA = wool production of the animal is 4 kg

WH = wool production of the flock is 3,5 kg

$$EBV = (4 - 3,5) \times 0,65 \text{ or } 0,5 \times 0,65$$

$$EBV = 0,325 \text{ kg}$$

(3)

[35]

105 marks

Total: 150 marks