basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P2

MEMORANDUM

FEBRUARY/MARCH 2014

MARKS: 150

This memorandum consists of 9 pages.

SECTION A

1.1 Multiple-choice questions

1.1.1	A✓✓		
1.1.2	B✓✓		
1.1.3	A✓✓		
1.1.4	D✓✓		
1.1.5	C✓✓		
1.1.6	B✓✓		
1.1.7	B✓✓		
1.1.8	A✓✓		
1.1.9	C✓✓		
1.1.10	A✓✓	(10 x 2)	(20)

1.2 Column A/Column B

1.2.1	D✓✓		
1.2.2	F✓✓		
1.2.3	A✓✓		
1.2.4	I✓✓		
1.2.5	B✓✓	(5 x 2)	(10)

1.3 ONE word/term

1.3.1	Co-operative/pool system ✓✓		
1.3.2	Labour ✓✓		
1.3.3	Credit/Loan ✓✓		
1.3.4	Up-grading ✓✓		
1.3.5	Mutation ✓✓	(5 x 2)	(10)

1.4 Change the underlined word

1.4.1	net income ✓		
1.4.2	pool ✓		
1.4.3	capital ✓		
1.4.4	management ✓		
1.4.5	dominant ✓	(5 x 1)	(5)

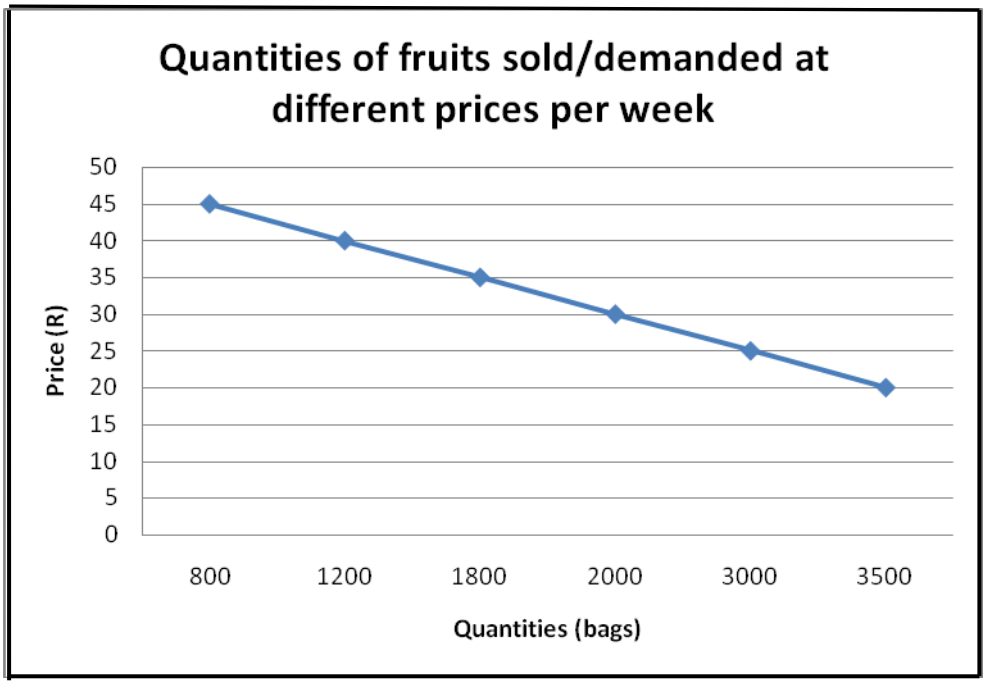
TOTAL SECTION A: 45

SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT

2.1 Price and the quantity of fruits

2.1.1 Line graph



Marking graph with the following checklist:

Criteria	Yes:1 Mark	No: 0 Mark
1. Line graph	1 ✓	
2. X-axis labelled	1 ✓	
3. Y-axis labelled	1 ✓	
4. Points are plotted correctly	1 ✓	
5. Correct heading	1 ✓	
6. Correct units	1 ✓	

(6)

2.1.2 Aspect of marketing

- Demand ✓ (1)

2.1.3 Implication of the marketing aspects represented by the curve

- The lower the price ✓
- The higher the quantities of fruits that will be demanded/purchased and vice versa✓ (2)

2.1.4 Effect of real income of consumers

- The greater the buying power ✓
- The greater the demand for a product ✓
- Increase in quantities demanded✓
- Influences the price✓ (Any 2) (2)

2.2 Bee-keeping enterprise

2.2.1 Entrepreneur – a person who sees opportunities for a business✓ and uses them for profit ✓ (2)

2.2.2 **TWO strategies to add value to the enterprise**

- Sell the brood chambers ✓
- Hire hives out with swarms of bees ✓
- Produce candles ✓
- Produce propolis (natural antiseptic cream) ✓ (Any 2) (2)

2.2.3 **FOUR greatest challenges for the entrepreneurs**

- Planning ✓
- Training of more entrepreneurs ✓
- Finding a market ✓
- Lack of equipment ✓
- Safety (bees are dangerous) ✓ (Any 4) (4)

2.2.4 **Sustainable business plan**

- General overview of the business ✓
- Marketing information ✓
- Details of staff ✓
- Financial details ✓ (Any 2) (2)

2.3 Route of meat from the farm to the consumer.

2.3.1 **Calculate the consumer price**

(a) Consumer price

- R30 + R2 + R14,50 ✓
- = R46,50 ✓ (2)

(b) Percentage of profit

- R14,50 – R5 = R9,50 ✓
- $\frac{9,50}{14,50} \times 100$ ✓
- 65,5% ✓ (3)

2.3.2 **Aspects of the schematic representation**

(a) Processer: Abattoir/butchery ✓ (1)

(b) Retailer: Butchery ✓ (1)

(c) Producer: Farmer ✓ (1)

2.3.3 **Marketing aspect as illustrated**
- Agri-business chain marketing channel✓ (1)

2.3.4 **Disadvantage of marketing aspect to the consumer**
- Costs are added to the raw product✓
- Product cannot be bought directly from the producer ✓ (Any 1) (1)

2.4 **Factors hampering the marketing of products**
- Perishability ✓
- High marketing costs ✓
- Uncertainty in production due to climate ✓
- Seasonal fluctuations ✓
- Variation in quality/standardisation ✓ (Any 4) (4)

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QUESTION 3: PRODUCTION FACTORS AND MANAGEMENT

3.1 **Capital as a production factor**

3.1.1 **Examples of capital**

(a)Fixed capital items
- Land✓
- Windmill ✓
- Tank/dam✓ (Any 2) (2)

(b) Movable capital items
- Cattle ✓
- Sheep✓ (2)

3.1.2 **TWO sources of fixed capital**
- Own savings ✓
- Credit ✓
- Trust companies ✓
- Money lenders ✓
- Grant ✓
- Co-operatives ✓ (Any 2) (2)

3.1.3 **Identified problem** (1)
- Over-capitalisation✓

and
- More capital with little return✓
- If too much capital is invested in relation to other production factors, a farm is overcapitalised and the profit will drop✓
- more capital implies more interest for no extra profit✓ (Any 1) (1)

3.2 Income and expenditure summary of a farm

3.2.1 Type of budget summary
Cash Flow Budget✓ (1)

3.2.2 Budget summary for:
(a) (opening balance) = -R6 800✓
(b) (total income) = R33 000✓
(c) (profit/loss) = R27 500✓
(d) (closing balance) = R20 700✓ (4)

3.3 Case study on worker summit

3.3.1 Main aim of summit
- Improvement of the lives of farm workers and dwellers. ✓ (1)

3.3.2 Role player to defend and uphold dignity of farm workers
Human Rights Commission✓ (1)

3.3.3 Changes related to farm labour
(a) Workers will be exposed to basic education and skills development✓
(b) A policy to govern burials on farms will be developed✓ (3)
(c) Comprehensive health care programmes will be expanded✓

3.3.4 Effect of improved living conditions
- Better living conditions will result in increased ✓
- Productivity of farm workers and the profitability ✓ of farms can be expected to increase. ✓ (Any 2) (2)

3.4 Land as a production factor

3.4.1 Problem related to land as a production factor
- Land/soil is subject to the law✓ of diminishing return ✓ (2)

3.4.2 Implication of the problem
- Once the land has reached maximum point of production, the increase in yield ✓is not proportional to increase in input ✓ (2)

3.4.3 Yield response
- The rate of production increase between 5-10(b) is more✓ than that between 10-15(c) ✓ **OR**
- The rate of production increase at b ✓is more than that at c ✓ (2)

3.4.4 **TWO ways to improve productivity of land**

- Applying crop rotation ✓
- Mulching ✓
- Addition of organic material ✓
- Scheduled irrigation/water provision✓ (Any 2) (2)

3.5 **HIV/Aids**

3.5.1 **Possible implications of HIV/Aids**

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

3.5.2 **FOUR actions to be included in a strategic plan**

- Aids awareness campaigns ✓
- Access to condoms ✓
- Access to treatment for sexually transmitted infections ✓
- Access to anti-retroviral drugs ✓
- Education on morally acceptable behaviour✓ (Any 4) (4)

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QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1 **Dwarf size caves**

4.1.1 **Type of breeding**

Upgrading/crossbreeding ✓ (1)

4.1.2 **TWO advantages of this breeding practice**

- Deformities and unwanted characteristics occur less frequently✓
- Initially rapid results: 50% improvement on the F_1 and 75% on the F_2✓
- Economical way of raising stock to pedigree level✓
- New breed with better traits gradually introduced✓
- Increase the variability ✓
- The herd will become more heterozygous ✓
- New combinations and gene characteristics ✓
- Produce hybrid vigour ✓ (Any 2) (2)

4.1.3 **Most important factor determining the success**

- Keep accurate records ✓
- Accurate selection for specific characteristics ✓
- Breeding plan with pre-set goals ✓ (Any 1) (1)

4.1.4 **Reason for selection of bulls**

- Bulls will genetically have a larger impact on the percentage of genes being transferred to the herd ✓ (1)

4.1.5 **Term to describe a bull responsible for this gene**
Carrier/resistive gene ✓ (1)

4.1.6 **Genotype of a dwarf calf**
Recessive/ aa ✓ (1)

4.1.7 **Reason why dwarfism is undesirable**
- Decrease in production ✓
- Recessive genes are inheritable ✓
- Devaluation of individual animals/herd ✓
- Negative impact on genetic progression ✓ (Any 1) (1)

4.2 **Hereditary characteristics**

4.2.1 **TWO characteristics to improve the herd**
- Meat tenderness ✓
- Weight gain ✓
- Reason - Heritability is above 60% and the traits will be transferred to the offspring ✓ (3)

4.2.2 **Calculation of estimated breeding value**
WA = weight gain of the animal is 750 g per day
WH = weight gain of the herd is 600 g per day

EBV = (WA - WH) x heritability of weight gain
EBV = 750 g – 600 g x 0,85 ✓
EBV = 150 g x 0,85 = 127 g/day above that of the herd ✓✓ (3)

4.2.3 **Motivation for keeping or slaughtering the animal**
- Should be kept/not to be slaughtered ✓

Reason
- Weight is 127 g/day✓ which is above the average of the herd, positive characteristic ✓
- Greater chances because of 85% heritability✓ to transfer the characteristic ✓ (Any 1) (3)

4.2.4 **Accurate method of calculating EBV**
- The farmer may incorporate the use of biometrics/computer programmes✓ (1)

4.3 **Genetic modification**

4.3.1 **Process of genetic modification**
- 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 ✓ (Any 2) (2)

4.3.2 **THREE advantages of genetic modification**

- 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 **TWO disadvantages(concerns) of genetic modification**

- Shift from agriculture to biotechnology✓
- GM foods may pose long-term health risk✓
- May lead to lower yields and lower profitability to farmers✓
- Some genetically modified crops may be toxic to plant eating insects✓
- Likelihood of reducing biodiversity of crop land✓ (Any 2) (2)

4.3.4 **Motivation for hybridisation to be labour-intensive in plant breeding**

- A lot of expertise/knowledge is required✓ to prevent cross pollination ✓
- Each flower✓ needs special attention ✓ (Any 2) (2)

4.4 **Family tree/pedigree chart**

4.4.1 **Genotype of individuals**

- No. 1 - aa ✓
- No. 8 - Aa ✓ (2)

4.4.2 **Phenotype of individuals**

- No. 5 - dark ✓
- No. 12 - white ✓ (2)

4.4.3 **Homozygous and heterozygous individuals**

(a) Homozygous - No. 10 ✓ (1)
(b) Heterozygous - No. 3 ✓ (1)

4.4.4 **Probability of female offspring**

$\frac{3}{7}$✓ x $\frac{100}{1}$ = 42.9%✓ (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150