Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2020

AGRICULTURAL SCIENCES P2
MARKING GUIDELINE
(EXEMPLAR)

MARKS: 150

This marking guideline consists of 9 pages.

SECTION A

QUESTION 1

1.1	1.1.1	A ✓✓		
	1.1.2	C ✓✓		
	1.1.3	B ✓✓		
	1.1.4	C ✓✓		
	1.1.5	B ✓✓		
	1.1.6	C ✓✓		
	1.1.7	C ✓✓		
	1.1.8	A ✓✓		
	1.1.9	D ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	H ✓✓		
	1.2.2	E ✓✓		
	1.2.3	F ✓✓		
	1.2.4	B ✓✓		
	1.2.5	A ✓✓	(5 x 2)	(10)
1.3	1.3.1	Transpirational pull ✓✓		
	1.3.2	Fertiliser ✓✓		
	1.3.3	Pollination ✓✓		
	1.3.4	Integrated Pest Management ✓✓		
	1.3.5	Green house ✓✓	(5 x 2)	(10)
1.4	1.4.1	Diffusion ✓		
	1.4.2	Germination ✓		
	1.4.3	Monoculture ✓		
	1.4.4	Aquaculture ✓		
	1.4.5	Survey ✓	(5 x 1)	(5)
			TOTAL SECTION A:	**45**

SECTION B

QUESTION 2: PLANT STUDIES (NUTRITION)

2.1 2.1.1 **Process represented by the chemical equation**
Photosynthesis ✓ (1)

2.1.2 **Compound B**
Glucose ✓ (1)

2.1.3 **Plant organs where compound B is found**
- Leaves ✓
- Stems ✓
- Roots ✓
- Tubers ✓
- Bulbs ✓ (Any 2) (2)

2.1.4 **Methods of speeding up the rate of photosynthesis**
- Use of greenhouses ✓
- Pruning ✓
- Trellising systems ✓
- Using optimum plant density ✓ (Any 2) (2)

2.2 2.2.1 **Functions of water in plants**
- Provides mechanical rigidity to cells ✓
- Important in chemical reactions ✓
- A universal solvent ✓
- It serves as a transport medium ✓
- Temperature regulation ✓ (Any 2) (2)

2.2.2 **Adaptation of the plant to reduce transpiration rate**
- Leaves are reduced ✓
- Photosynthesis occurs on stems ✓
- Stems store water ✓
- Stems are shiny to reflect heat waves and reduce transpiration ✓ (Any 3) (3)

2.2.3 **Consequences of lack of adaptations to reduce water loss**
- Plant cannot carry out metabolism due to lack water ✓
- Failure to regulate temperature ✓
- Failure to transport minerals and products of photosynthesis ✓
- Wilting ✓
- Senescence ✓ (Any 2) (2)

2.3 2.3.1 **Classification of inorganic fertiliser**
Inorganic fertiliser ✓ (1)

2.3.2 **Examples of phosphorus fertilisers**
- Superphosphate / mono-calcium phosphate ✓
- Raw/rock phosphate ✓ (2)

2.3.3 **Percentage nitrogen in a fertiliser bag**
N = 280 g/1 000 g x 100 ✓
= 28% ✓ (2)

2.3.4 **Evidence of state regulation of fertiliser production**
- Registration number ✓
- Act number 36 of 1947 ✓ (2)

2.4 2.4.1 **Identification of structure C**
Transport protein ✓ (1)

2.4.2 **Identification of transport mechanisms**
A – Passive uptake ✓
B – Active uptake ✓ (2)

2.4.3 **Motivation of answers to QUESTION 2.4.2**
- **A** does not require energy in the form of ATP while in **B** energy is required ✓

OR

- In **A** movement is along concentration gradient ✓ while in **B** movement is against concentration gradient ✓ (2)

2.5 2.5.1 Basal application (1)
2.5.2 Broadcasting ✓ (1)
2.5.3 Foliar application ✓ (1)
2.5.4 Band placing ✓ (1)
2.5.5 Fertigation ✓ (1)

2.6 2.6.1 **Deduction of an advantage of green manuring**
Soil conservation ✓ (1)

2.6.2 **Explanation of the advantage of using leguminous plants**
Legumes form a mutually symbiotic relationship with nitrogen fixing bacteria, ✓ which improve the nitrogen content of the soil. ✓

OR

Legumes are rich in proteins ✓ upon being ploughed under as green manures they are decomposed by microbes to nitrogen containing compounds increasing the soil's nitrogen content. ✓ (2)

2.6.3 **Advantages of green manuring**
- Reduces soil erosion ✓
- Improves soil fertility ✓
- Improves soil structure ✓ (Any 2) (2)

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QUESTION 3: PLANT REPRODUCTION AND PROTECTION

3.1 3.1.1 **Name of plant propagation method**
Grafting ✓ (1)

3.1.2 **Labelling**
A – scion ✓
B – rootstock ✓ (2)

3.1.3 **Advantages of plant propagation method in QUESTION 3.1.1.**
- Fruit trees can be produced with several varieties ✓
- The appearance or form of a plant can be changed ✓
- An undesirable trait can be corrected ✓
- The scion can be grafted onto a healthier rootstock with a more vigorous root system ✓ (Any 2) (2)

3.1.4 **Examples of fruit trees propagated using grafting in South Africa**
- Oranges ✓
- Lemons ✓
- Nartjie ✓
- Grapes ✓
- Macadamia ✓
- Avocado ✓
- Nectarines ✓
- Apples ✓ (Any 2) (2)

3.2 3.2.1 **Name of phenomenon described in the passage**
Ablactation ✓ (1)

3.2.2 **Biological cause of ablactation in the passage**
Inadequate pollination/thrips ✓ (1)

3.2.3 **Climatic causes of ablactation**
- Frost ✓
- Excessive rain ✓
- Wind ✓ (Any 2) (2)

3.2.4 **Methods of protecting crops from climatic factors mentioned in QUESTION 3.2.3**
Frost – tunnels/greenhouses/mulching ✓
Excessive rain – greenhouses/tunnels ✓
Wind – Shade houses/wind breaks/greenhouses/tunnels ✓ (Any 2) (2)

3.3. **Matching propagation methods with appropriate plant**
3.3.1 cuttings ✓ (1)
3.3.2 bulbs ✓ (1)
3.3.3 tubers ✓ (1)
3.3.4 rhizomes ✓ (1)
3.3.5 runners ✓ (1)

3.4 3.4.1 **Meaning of acronym GMO**
Genetically Modified Organism ✓ (1)

3.4.2 **Advantage of GM technology mentioned in the passage**
Production of herbicide resistant plants ✓ (1)

3.4.3 **Other methods of plant improvement in addition to GM technology**
- Selection ✓
- Hybridisation ✓
- Mutation ✓ (Any 2) (2)

3.5 3.5.1 **Environmental conditions that lead to rapid multiplication of pathogens**
- Monocultures ✓
- High planting densities ✓
- High humidity ✓
- High temperatures ✓ (Any 2) (2)

3.5.2 **Micro-organisms that cause diseases**
- Viruses ✓
- Bacteria ✓
- Fungi ✓ (Any 2) (2)

3.5.3 **Measures for preventing spread of plant diseases**
- Remove all weeds ✓
- Avoid overcrowding plants ✓
- Use disease resistant varieties ✓
- Practise intercropping ✓
- Disinfect pruning tools ✓
- Practise crop rotation ✓ (Any 2) (2)

3.6 3.6.1 **Matching insects with the statements given**
(a) – A ✓
(b) – C ✓
(c) – B ✓ (3)

3.6.2 **Advantages of using the pest control method in QUESTION 3.6.1. (c)**
- Not harmful to the environment ✓
- No need to purchase expensive chemical pesticides ✓ (2)

3.6.3 **Non-chemical pest control methods**
- Crop rotation ✓
- Biological control ✓
- Intercropping ✓
- Mechanical control ✓
- Burning ✓ (Any 2) (2)

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QUESTION 4: OPTIMAL RESOURCE UTILISATION

4.1 4.1.1 **Identification of drainage layouts**
A – Grid system ✓
B – Herringbone system ✓ (2)

4.1.2 **Letter for the drainage layout which can be used in the given cases**
(a) B ✓
(b) C ✓
(c) A ✓ (3)

4.1.3 **Factors farmers should consider when installing pipe drainage systems**
- Pipe diameter ✓
- Depth of drains ✓
- Drain slope ✓ (Any 2) (2)

4.2 4.2.1 **Example of a primary tillage implement**
- Plough ✓
- Ripper ✓ (Any 1) (1)

4.2.2 **Main aim of secondary tillage**
- To break clumps of soil left by primary tillage implements ✓ (1)

4.2.3 **Differentiate between primary and secondary cultivation**
Primary tillage tends to produce a rough surface finish ✓ whereas secondary tillage tends to produce a smoother surface finish. ✓ (2)

4.3 4.3.1 **Identification of instruments A and B**
A – Tensiometer ✓
B – Class A evaporation pan ✓ (2)

4.3.2 **Advantages of irrigation scheduling**
- Minimises crop water stress ✓
- Reduces the farmer's cost of water and labour ✓
- Minimises waterlogging problems ✓
- Increases crop yields and quality ✓ (Any 2) (2)

4.3.3 **Sources of water for irrigation**
- Lakes / dams ✓
- Permanent rivers / streams ✓
- Aquifers / springs / boreholes ✓ (2)

4.4 4.4.1 **Identification of the farming system**
Precision farming ✓ (1)

4.4.2 **Identify a piece of equipment which plays a central role in the farming system in the scenario**
GPS ✓ (1)

4.4.3 **Deduction of TWO advantages of the system**
- Allows the farmer to compare harvest information and identify poor spots in lands ✓
- Allows the farmer to see exactly how much has been harvested from specific areas in the land ✓ (Any 2) (2)

4.4.4 **Other pieces of equipment required for successful implementation of precision farming**
- GIS maps ✓
- Computers ✓
- Satellites ✓ (Any 2) (2)

4.5 4.5.1 **Table showing the response of a farmer's crop to two watering regimes**

Year	Maize yield (t)	
	Rainfed	Irrigated
2010	80	90
2011	120	140
2012	80	82
2013	60	80
2014	90	110

Marking checklist
- Title ✓
- Units (t) ✓
- Correct rainfed yields ✓
- Correct irrigated yields ✓
- Correct years ✓
- Accuracy ✓ (6)

4.5.2 **Water delivery method which results in higher yields**
Irrigation ✓ (1)

4.5.3 **Justification for answer to QUESTION 4.5.2**
Irrigated fields had higher yields than rainfed fields over the 5 years ✓ (1)

4.5.4 **Prediction of what could have caused the results in 2012**
There were sufficient rains in 2012. ✓ As a result, there were no significant differences between irrigated and rainfed fields. ✓ (2)

4.5.5 **Challenges that limit the widespread adoption of irrigation systems**

- Lack of water sources ✓
- Cost of installation and maintenance of the irrigation systems ✓
- Lack of knowledge required to run and maintain the irrigation systems ✓ (Any 2) (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150