



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2020**

**AGRICULTURAL SCIENCES P2  
MARKING GUIDELINE  
(EXEMPLAR)**

**MARKS: 150**

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This marking guideline consists of 9 pages.

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**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**
- $N = 280 \text{ g}/1\ 000 \text{ g} \times 100$  ✓
- $= 28\%$  ✓
- (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**