Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2023

AGRICULTURAL SCIENCES P2 MARKING GUIDELINE

MARKS: **150**

This marking guideline consists of 9 pages.

SECTION A

QUESTION 1

1.1	1.1.1	C ✓✓		
	1.1.2	A ✓✓		
	1.1.3	A ✓✓		
	1.1.4	C ✓✓		
	1.1.5	B ✓✓		
	1.1.6	C ✓✓		
	1.1.7	B ✓✓		
	1.1.8	D ✓✓		
	1.1.9	D ✓✓		
	1.1.10	B ✓✓	(10 x 2)	(20)
1.2	1.2.1	F ✓✓		
	1.2.2	D ✓✓		
	1.2.3	A ✓✓		
	1.2.4	J ✓✓		
	1.2.5	C ✓✓	(5 x 2)	(10)
1.3	1.3.1	Transpirational pull ✓✓		
	1.3.2	Agricultural lime ✓✓		
	1.3.3	Integrated Pest Control ✓✓		
	1.3.4	Biotechnology ✓✓		
	1.3.5	Soil surveying ✓✓	(5 x 2)	(10)
1.4	1.4.1	Fertilisation ✓		
	1.4.2	Oxygen ✓		
	1.4.3	Monoculture ✓		
	1.4.4	Legumes ✓		
	1.4.5	Fallow ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

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SECTION B

QUESTION 2: PLANT STUDIES (NUTRITION)

2.1 2.1.1 **Process shown in the diagram**
Photosynthesis ✓ (1)

2.1.2 **Identification of product**
Sugar ✓ (1)

2.1.3 **Storage organs for products of photosynthesis**
- Roots ✓
- Stems ✓
- Leaves ✓
- Seeds ✓ (Any 2 x 1) (2)

2.1.4 **Factors influencing the rate of photosynthesis**
- Light intensity ✓
- Temperature ✓
- Carbon dioxide concentration ✓
- Water ✓ (Any 2 x 1) (2)

2.1.5 **Methods of optimising photosynthesis**
- Use of a greenhouse / tunnel ✓
- Plant density ✓
- Trellising plants ✓
- Pruning ✓ (Any 2 x 1) (2)

2.1.6 **Consequences of the absence of photosynthesis**
- Plants and animals will die due to lack of oxygen ✓
- Animals will die of hunger ✓
- Global warming ✓ due to absence of plants that absorb carbon dioxide ✓ (Any 2 x 1) (2)

2.2 2.2.1 **Identification of processes A and B**
A – Osmosis ✓
B – Transpiration ✓ (2)

2.2.2 **Importance of water movement in plants**
- Transport of nutrients ✓
- Temperature regulation ✓
- Uptake of nutrients ✓ (Any 2 x 1) (2)

2.2.3 **Ways plants use to reduce water loss through transpiration**
- Waxy cuticle ✓
- Hairy leaves ✓
- Small leaves ✓
- Stomata on underside of leaves ✓ (Any 2 x 1) (2)

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2.3 2.3.1 **Labels**

B – Micro ✓
C – Potassium ✓
D – K^+ ions ✓
E – NO_3^- / NH_4^+ ✓
F – Stunted growth / Leaf chlorosis ✓
G – Macro ✓ (6 x 1) (6)

2.3.2 **Methods that can be used to determine the nutrient status of soils**

- Soil analysis ✓
- Plant analysis ✓ (2)

2.4 2.4.1 **Difference between passive and active mineral uptake**

Passive uptake	Active uptake
• Nutrients move down the concentration gradient ✓	• Nutrients move against the concentration gradient ✓
• No energy required ✓	• Energy in the form of ATP required ✓
• Carrier molecule not required ✓	• Carrier molecule required ✓

(Any 4 x 1) (4)

2.4.2 **Factors affecting nutrient availability**

Soil texture ✓
Soil pH ✓ (2)

2.5 2.5.1 **Classification of fertilisers**

Farmer A – Organic fertiliser ✓
Farmer B – Inorganic fertiliser ✓ (2)

2.5.2 **Environmental effects of inorganic fertilisers**

- Can lead to eutrophication ✓
- Soil acidification ✓
- Storage and application of nitrogenous fertilisers emits greenhouse gases ✓
- Can destroy soil food webs ✓ (Any 2 x 1) (2)

2.5.3 **An example of a nitrogenous fertiliser**

Lime ammonium nitrate / Ammonium nitrate ✓ (Any 1 x 1) (1)

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QUESTION 3: PLANT REPRODUCTION AND PROTECTION

3.1 3.1.1 **Captions for diagrams 1 and 2**
Diagram 1 – Stamen / androecium ✓
Diagram 2 – Pistil / gynoecium ✓ (2)

3.1.2 **Function of Part C in diagram 2**
Fuses with the male gamete ✓ (1)

3.1.3 **Identification of flower parts**
B – stigma ✓
D – ovary ✓ (2)

3.1.4 **Name of process**
Pollination ✓ (1)

3.1.5 **Examples of pollination agents**
- Insects ✓
- Birds ✓
- Water ✓
- Wind ✓ (Any 2 x 1) (2)

3.1.6 **Letter of a part that will develop into:**
(a) – D ✓
(b) – C ✓ (2)

3.2 3.2.1 **Identification of processes**
A – Parthenocarpy ✓
B – Ablactation ✓ (2)

3.2.2 **Types of process A**
- Vegetative parthenocarpy ✓
- Stimulative parthenocarpy ✓ (2)

3.2.3 **Factors that influence the process B**
- Strong winds ✓
- Low temperatures / frost ✓
- Mineral deficiencies ✓
- Too many fruits ✓
- Insect pests ✓
- Deformed flowers ✓ (Any 2 x 1) (2)

3.3 **Identification of the process**

3.3.1 Germination ✓ (1)

3.3.2 **Name of the process**
Dormancy ✓ (1)

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3.3.3 **Strategies for overcoming dormancy**
- Priming / soaking seeds ✓
- Scarification ✓ (Any 2 x 1) (2)

3.3.4 **Requirements for seed germination**
- Favourable temperature
- Adequate water supply
- Availability of oxygen (Any 1 x 1) (1)

3.4 3.4.1 **Name of parts A and B**
A – Scion ✓
B – Root stock ✓ (2)

3.4.2 **Classification of reproduction type**
Asexual reproduction ✓ (1)

3.4.3 **Justification of answer to QUESTION 3.4.2**
Does not involve the fusion of gametes ✓ (1)

3.4.4 **Advantages of asexual reproduction**
- Fertilisation does not need to take place ✓
- Avoid overcrowding plants ✓
- Root stock and scion can be from different varieties ✓
- Can be used where seed propagation is not practical ✓
- Produces fruits that are true to type ✓
- When introducing new cultivars it not necessary to remove the old trees and replace them with young trees ✓ (Any 2 x 1) (2)

3.5 3.5.1 **Identification of the role of weeds in plant disease outbreaks**
They serve as hosts for pathogens ✓ (1)

3.5.2 **Examples of mechanical weed control methods**
- Fire ✓
- Cultivation ✓
- Mowing / Slashing / cutting ✓ (Any 2 x 1) (2)

3.5.3 **Contributions of the state towards plant protection**
- Quarantine services ✓
- Seed certification systems ✓
- Legislation ✓
- Research ✓
- Depositories ✓ (Any 3 x 1) (3)

3.5.4 **Examples of stored grain pests**
- Rice / Maize weevil ✓
- Grain beetle ✓
- Grain / Flour moth ✓
- Flour beetle ✓ (Any 2 x 1) (2)

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QUESTION 4: OPTIMAL RESOURCE UTILISATION

4.1 4.1.1 **Identification of farming system**

Precision farming ✓ (1)

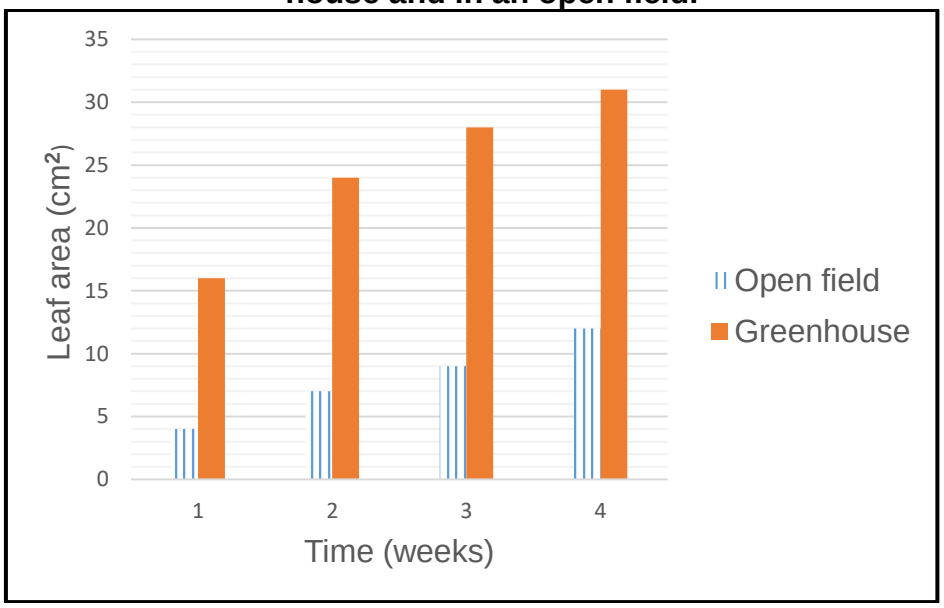
4.1.2 **Key technologies used in precision farming**

- Global Positioning System / GPS ✓
- Geographical Information System / GIS ✓ (2)

4.1.3 **Aims of precision farming**

- To allow the farmer to have more precise control over natural variation in soil on the farm ✓
- To enable the farmer to apply inputs only as needed and where needed to ensure optimum production ✓ (2)

4.2 4.2.1 **Comparison between the leaf size of spinach grown in a green house and in an open field.**



- Correct heading with both variables ✓
- Correct graph type ✓
- Units (Weeks / cm^2) ✓
- *y*-axis: Correct labelling and calibration ✓
- *x*-axis: Correct labelling and calibration ✓
- Correct plotting (80% and more correct plotting) ✓ (6)

4.2.2 **Conclusion that can be drawn from the information in the graph**

Plants grown in greenhouses have bigger leaves ✓ than those grown in an open field over 4 weeks. ✓ (2)

4.2.3 **Explanation for the differences in leaf sizes**

Plants grown in the green house grow faster because temperatures are higher ✓ in the greenhouse, resulting in higher photosynthetic rates. ✓ (2)

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4.3 4.3.1 **Aims of soil cultivation**

- Bury plant remains ✓
- Incorporate fertiliser and lime into the soil ✓
- Control weeds ✓
- To break up soil crusts ✓
- Loosen the soil to make root penetration and infiltration easier ✓

(Any 2 x 1) (2)

4.3.2 **Differences between primary and secondary cultivation**

Primary tillage cut and shatters the soil with deep penetration tools to produce a rough surface finish ✓ whereas secondary tillage aims to level and firm the top part of the soil to produce a smoother surface finish. ✓ (2)

4.3.3 **Tools used in primary and secondary cultivation**

Primary cultivation

- Ploughs ✓
- Rippers ✓

Secondary cultivation

- Harrows ✓
- Cultivators ✓ (Any 2 x 1) (2)

4.3.4 **Environmentally friendly cultivation systems**

- Minimum tillage ✓
- Zero tillage ✓
- Mulching method ✓ (Any 2 x 1) (2)

4.4 4.4.1 **Identification of process**

Crop rotation ✓ (1)

4.4.2 **Principles of crop rotation shown in the table**

- Crops that require the same nutrients should not follow each other ✓
- Crops that are affected by the same pests and diseases should not follow each other ✓
- Shallow rooted crops should be followed by deep rooted crops ✓

(Any 2 x 1) (2)

4.4.3 **Reasons for recommending crop rotation**

- Protects the farmer from total crop failure ✓
- Maintains soil fertility ✓
- Improves soil structure ✓
- Controls pests and diseases ✓
- Increases soil nitrogen content ✓ (Any 2 x 1) (2)

4.5 4.5.1 **Identification of cultivation system**

Hydroponics ✓ (1)

4.5.2 **Difference between *hydroponics* and *open field system***
Hydroponics is involves growing plants in a water-based nutrient solution ✓ while the open field involves growing crops directly onto the soil. ✓ (2)

4.5.3 **Examples of growth media that can be used in hydroponics**
Vermiculite ✓
Perlite ✓ (2)

4.5.4 **Advantages of the closed hydroponic system**
- Uniform irrigation ✓
- Savings on water and fertiliser ✓
- No growth medium is necessary ✓ (Any 2 x 1) (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150

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