



Province of the
EASTERN CAPE
EDUCATION

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NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2025

AGRICULTURAL SCIENCES P2 MARKING GUIDELINE

MARKS: 150

This marking guideline consist of 9 pages.

SECTION A**QUESTION 1**

- | | | | | |
|-----|--------|----------------------------|----------|------|
| 1.1 | 1.1.1 | B ✓✓ | | |
| | 1.1.2 | C ✓✓ | | |
| | 1.1.3 | A ✓✓ | | |
| | 1.1.4 | D ✓✓ | | |
| | 1.1.5 | B ✓✓ | | |
| | 1.1.6 | C ✓✓ | | |
| | 1.1.7 | C ✓✓ | | |
| | 1.1.8 | C ✓✓ | | |
| | 1.1.9 | D ✓✓ | | |
| | 1.1.10 | A ✓✓ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | E ✓✓ | | |
| | 1.2.2 | D ✓✓ | | |
| | 1.2.3 | F ✓✓ | | |
| | 1.2.4 | I ✓✓ | | |
| | 1.2.5 | H ✓✓ | (5 x 2) | (10) |
| 1.3 | 1.3.1 | Pistil ✓✓ | | |
| | 1.3.2 | Scarification ✓✓ | | |
| | 1.3.3 | Herbicides ✓✓ | | |
| | 1.3.4 | Genetic modification/GM ✓✓ | | |
| | 1.3.5 | Crop rotation ✓✓ | (5 x 2) | (10) |
| 1.4 | 1.4.1 | Micro-elements ✓ | | |
| | 1.4.2 | Xylem ✓ | | |
| | 1.4.3 | Osmosis ✓ | | |
| | 1.4.4 | Conservation ✓ | | |
| | 1.4.5 | Survey ✓ | (5 x 1) | (5) |

TOTAL SECTION A: 45

SECTION B**QUESTION 2: PLANT STUDIES (NUTRITION)**

- 2.1 2.1.1 **Role played by chlorophyll**
• It absorbs light energy ✓ (1)
- 2.1.2 **Definition of photosynthesis**
• Is the process in which green plants use water and carbon dioxide ✓
to produce oxygen and glucose. ✓ (2)
- 2.1.3 **Importance of the process of photosynthesis**
• For production of atmospheric oxygen ✓
• Production of food (carbohydrates) ✓
• Reduction of carbon dioxide in the atmosphere ✓
• Production of fossil fuels ✓
• Converts radiant energy from the sun to chemical energy ✓
(Any 2 x 1) (2)
- 2.1.4 **Plant organs which store products of photosynthesis.**
• Stems ✓
• Bulbs ✓
• Leaves ✓
• Fruit ✓
• Seeds ✓
• Tubers ✓
(Any 2 x 1) (2)
- 2.1.5 **Methods of optimising the process of photosynthesis**
• Use of a greenhouse / tunnel ✓
• Trellising plants ✓
• Pruning ✓
• Control plant density ✓
(Any 2 x 1) (2)
- 2.2 2.2.1 **Mechanism of absorbing minerals against their concentration**
• Active ion uptake ✓ (1)
- 2.2.2 **Structural adaptability of broad-leaved plants to reduce water loss**
• They have stomata on the underside of the leaves ✓
• Stomata are surrounded by two guard cells ✓
• Leaves have thick waxy coating or shiny leaves to reflect heat waves ✓
• Some have dense layers of plant hairs on the surface ✓
• Stomata are closed at night ✓
• Storage of water in stems ✓
(Any 2 x 1) (2)
- 2.2.3 **Functions of water in plants**
• Serves as a solvent for the mineral nutrients ✓
• Acts as a transport medium for the dissolved mineral nutrients ✓
• Water regulates the temperature of the plant ✓
• Water provides turgor in plant cells ✓
(Any 3 x 1) (3)

2.2.4 Definition of Translocation

- Transport/movement of soluble substances like sugars ✓ from one part of the plant to another through phloem. ✓ (2)

2.3 2.3.1 Primary and secondary minerals and deficiency symptoms

- A – Macro element ✓
- B – K⁺ ✓
- C – Chlorosis / Brown tips ✓
- D – Zn²⁺ ✓
- E – Micro element ✓ (5)

2.3.2 Factors affecting mineral availability

- Soil texture ✓
- Soil pH ✓ (2)

2.3.3 Methods to determine nutrient status of soil

- Soil analysis / soil sample test ✓
- Leaf sampling analysis / plant analysis ✓ (2)

2.4 2.4.1 Examples of organic fertilisers

- Compost ✓
- Green manure ✓
- Farm animal manure ✓
- Sewage waste ✓ (Any 1 x 1) (1)

2.4.2 Physical benefits of organic fertilisers

- Improve soil structure and soil texture ✓
- Improve water holding ✓
- Reduce soil compaction ✓
- Improve soil aeration ✓ (Any 3 x 1) (3)

2.4.3 Effects of inorganic fertilisers on the environment

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

2.4.4 Uses of gypsum in Agriculture

- Decreases the bulk density of soil ✓
- Prevents soil crusting ✓
- Prevents waterlogging of soil ✓
- Reduces water run-off and erosion ✓
- Improves soil structure ✓
- Corrects soil acidity ✓
- Reduces metal toxicity in soil ✓
- Improves aeration ✓ (Any 3 x 1) (3)

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QUESTION 3: PLANT REPRODUCTION AND PROTECTION

- 3.1 3.1.1 **Identification of flower parts.**
- A – Stigma ✓
 - B – Petal ✓
 - C – Egg cell ✓
- (3)
- 3.1.2 **Function of part D**
- Produce pollen grain ✓
- (1)
- 3.1.3 **Type of flower**
- Bisexual ✓
- (1)
- 3.1.4 **Motivation**
- The flower carries both male and female sex organs ✓
- (1)
- 3.1.5 **The process of transferring pollen grain to stigma**
- Pollination ✓
- (1)
- 3.1.6 **Examples of agents of pollination**
- Wind ✓
 - Water ✓
 - Insects ✓
 - Birds ✓
- (Any 2 x 1) (2)
- 3.2 3.2.1 **Advantage of abscission to plants**
- The fruit will be too heavy for the tree ✓
- (1)
- 3.2.2 **Soil factors causing abscission in plants**
- Mineral deficiencies ✓
 - Too much soil moisture ✓
 - Too little soil moisture ✓
- (Any 2 x 1) (2)
- 3.2.3 **Classification of apple fruits**
- Accessory fruits ✓
 - Apples develop from the ripened ovary and some other parts of the flower ✓
- (2)
- 3.2.4 **Definition of fertilisation**
- The fusion of the nucleus of a male gamete with the nucleus of a female gamete. ✓✓
- (2)
- 3.3 3.3.1 **Types of seed germination**
- A – Dicotyledonous ✓
 - B – Monocotyledonous plant ✓
- (2)
- 3.3.2 **Role played by cotyledons during germination**
- Protects the plumule and the first leaves from harm ✓
 - Storage organ for nutrients ✓
- (2)

- 3.3.3 **Basic requirements for seed germination**
- Sufficient moisture ✓
 - Enough oxygen ✓
 - Optimal temperature ✓
 - A period of breaking dormancy ✓
- (Any 2 x 1) (2)
- 3.3.4 **Two methods to break seed dormancy**
- Scarification ✓
 - Soaking seeds ✓
- (2)
- 3.4 3.4.1 **The plant propagation method**
- Artificial asexual reproduction ✓
- (1)
- 3.4.2 **Labels for parts A and B**
- **A** – Scion ✓
 - **B** – Rootstock ✓
- (2)
- 3.4.3 **Disadvantages of asexual reproduction**
- Reduces the gene pool in the progeny ✓
 - No genetic variation ✓
 - Susceptible to pests and diseases ✓
 - Lesser chances to survive environmental changes ✓
 - Negative mutations will be passed on to the offspring ✓
- (Any 3 x 1) (3)
- 3.5 3.5.1 **Mechanical weed control methods**
- Correct soil cultivation practices ✓
 - Cutting of weeds ✓
 - Burning fields ✓
- (2)
- 3.5.2 **Chemicals used to control pests**
- Pesticides ✓
- (1)
- 3.5.3 **How biotechnology can control pests and diseases**
- Manipulate plants genetically to produce cultivars that can resist the plant pests and diseases ✓✓
- (2)

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QUESTION 4: OPTIMAL RESOURCE UTILISATION**4.1 4.1.1 Definition of Soil survey**

- A methodical examination, classification, and description of soil by the physical examination of a soil profile ✓✓ (2)

4.1.2 Aims of soil survey in Agriculture

- To determine the suitability of soil for agricultural purposes ✓
- Aim at assisting farmers to decide how to utilise their soil ✓
- Land use planning ✓
- To understand soil properties ✓
- To manage soil resources effectively ✓ (Any 2 x 1) (2)

4.1.3 THREE factors to consider when a soil survey is done

- Soil texture ✓
- Soil structure ✓
- Soil depth ✓
- Soil colour ✓
- Soil pH and salinity ✓
- Soil fertility ✓ (Any 3 x 1) (3)

4.2 4.2.1 Farm implements

- 1 – Disc plough ✓
- 2 – Disc harrow ✓ (2)

4.2.2 Primary and secondary cultivation

- 1 – Primary ✓
- 2 – Secondary ✓ (2)

4.2.3 Objective of secondary cultivation

- To improve the seed bed by making the soil finer before the planting process take place. ✓ (1)

4.2.4 Advantages of conventional and conservation tillage

Conventional tillage	Conservation tillage
Breaks impermeable layers of soil ✓	Erosion is minimised ✓
Improves root growth ✓	Soil organic fraction is stabilised ✓
Seedbeds will prepare ✓	Soil compaction does not take place ✓
Improved aeration ✓	Soil structure remains intact ✓

(Any 2 x 2) (4)

- 4.3 4.3.1 **Name of farming methods**
- A – Greenhouse ✓ (1)
- 4.3.2 **Materials used**
- Polyethylene ✓
 - Glass ✓
 - Plastic sheeting ✓ (Any 1 x 1) (1)
- 4.3.3 **Advantages of using Greenhouse**
- Reduce damage due to frost, wind, and rain ✓
 - Crops can be produced for specific market dates ✓
 - Products of a high quality are produced ✓
 - Crops can be cultivated out of season ✓
 - The growing season is lengthened ✓
 - Reduces the threat of external pests or parasites ✓ (Any 2 x 1) (2)
- 4.3.4 **Plant growing technique**
- Hydroponics ✓ (1)
- 4.3.5 **How hydroponics operates**
- This is the art of growing plants in water and nutrient solution ✓ without the use of soil ✓ (2)
- 4.3.6 **Reasons why hydroponics is not common to subsistence farmers**
- Requires high technology ✓
 - Expensive to set up ✓
 - Needs technical knowledge ✓ (Any 1 x 1) (1)
- 4.4 4.4.1 **Advantages of crop rotation**
- Enables proper utilisation of soil nutrients ✓
 - Legumes increase the nitrogen content in the soil ✓
 - Way to control disease and pest outbreak ✓
 - Economic way to maintain soil fertility ✓
 - Reduces soil erosion ✓
 - Helps to control weeds ✓ (Any 2 x 1) (2)
- 4.4.2 **Reason for including a legume and deep root crop**
- Legumes increases the nitrogen content to the soil through bacteria on the root nodules ✓
 - Root crops helps to break compacted soil layers and promote aeration and better drainage ✓ (2)
- 4.4.3 **Principles to consider when designing a crop rotation program**
- Crops that require the same nutrients should not follow each other
 - Shallow rooted crops should be followed by deep rooted crops
 - Crops that are affected by the same pests and diseases should not follow each other
 - A legume plant should be included (Any 2 x 1) (2)

4.5 4.5.1 Table showing various precision technologies adopted and average cost saved per acre

Precision Technique	Yield Mapping	GPS soil mapping	Guidance system	Smart irrigation	Drones and satellites
Cost Saved (R/Acre)	25.01	13.45	14.98	21.87	20.56

Marking criteria

- Correct heading with two variables ✓
- All correct Precision techniques ✓
- Correct cost saved for all techniques ✓
- Correct units ✓

(4)

4.5.2 The technology that saves more cost of inputs per acre

- Yield mapping ✓

(1)

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TOTAL SECTION B: 105

GRAND TOTAL: 150