



Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Departement van Onderwys
Porafensie Ya Kapa Botjhabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2025

AGRICULTURAL SCIENCES P1 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 | D ✓✓ | | |
| | 1.1.4 | C ✓✓ | | |
| | 1.1.5 | B ✓✓ | | |
| | 1.1.6 | B ✓✓ | | |
| | 1.1.7 | A ✓✓ | | |
| | 1.1.8 | D ✓✓ | | |
| | 1.1.9 | C ✓✓ | | |
| | 1.1.10 | B ✓✓ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | A only ✓✓ | | |
| | 1.2.2 | None ✓✓ | | |
| | 1.2.3 | B only ✓✓ | | |
| | 1.2.4 | A only ✓✓ | | |
| | 1.2.5 | Both A and B ✓✓ | (5 x 2) | (10) |
| 1.3 | 1.3.1 | pH scale ✓✓ | | |
| | 1.3.2 | Nitrogen ✓✓ | | |
| | 1.3.3 | Immobilisation ✓✓ | | |
| | 1.3.4 | Cation adsorption ✓✓ | | |
| | 1.3.5 | Humus ✓✓ | (5 x 2) | (10) |
| 1.4 | 1.4.1 | Molecule ✓ | | |
| | 1.4.2 | Capillary water ✓ | | |
| | 1.4.3 | Saline ✓ | | |
| | 1.4.4 | Glucose ✓ | | |
| | 1.4.5 | Mineralisation ✓ | (5 x 1) | (5) |
| | | | | [45] |

TOTAL SECTION A: 45

SECTION B: BASIC AGRICULTURAL CHEMISTRY**QUESTION 2**

- 2.1 2.1.1 **Identification of the illustration.**
Periodic table of elements ✓ (1)
- 2.1.2 **Elements with atomic numbers 1 and 20.**
1 – Hydrogen ✓ (1)
20 – Calcium ✓ (1)
- 2.1.3 **TWO ways in which the elements are arranged.**
• Periods ✓ (1)
• Groups ✓ (1)
- 2.1.4 **Similarities between elements He, Ne and Ar**
• They are inert/non-reactive ✓
• Full valence electron shells ✓
• Colourless and odourless ✓ (Any 2 x 1) (2)
- 2.1.5 **Determination of valency**
(a) 2 ✓ (1)
(b) 6 ✓ (1)
- 2.2 2.2.1 **Compound classification**
Inorganic ✓ (1)
- 2.2.2 **Name of the compound in QUESTION 2.2.1.**
Sodium chloride ✓ (1)
- 2.2.3 **Chemical bonding in QUESTION 2.2.2.**
Ionic bonding ✓ (1)
- 2.2.4 **Justification of the answer in QUESTION 2.2.3.**
• The compound is formed when one atom gains ✓ a valence electron from another atom. ✓
• The Na⁺ and Cl⁻ ions are strongly attracted to each other, ✓ forming the ionic compound sodium chloride. ✓
• Chlorine (Cl) has 7 valence electrons ✓ and readily gains an electron to become a negatively charged chloride ion (Cl⁻). ✓
• Sodium (Na) has one valence electron and readily loses ✓ it to become a positively charged sodium ion. ✓ (Any 1 x 2) (2)
- 2.2.5 **Molecular formula**
Na ✓ Cl ✓ (2)
- 2.3 2.3.1 **Identification of compound**
Methane ✓ (1)
- 2.3.2 **Name of group of compounds to which the compound belongs**
Alkanes ✓ (1)
- 2.3.3 **Two characteristics of methane**
• It is a gas ✓
• Colourless ✓
• Odourless ✓ (Any 2 x 1) (2)

- 2.3.4 **Properties of carbon that allow it to make organic compounds**
- It is able to catenate ✓
 - It can form four covalent bonds ✓
 - It can form single, double and triple bonds ✓
 - It is relatively unreactive with a number of other elements ✓ (2)
- 2.4 2.4.1 **Chemical structures in diagram A and B above.**
- Diagram **A** – Saturated fatty acids ✓ (1)
- Diagram **B** – Unsaturated fatty acids ✓ (1)
- 2.4.2 **Motivation of the structures in diagrams A and B.**
- Diagram A**
- Have only single bonds between the carbon atoms in the fatty acids. ✓ (1)
- Diagram B**
- Have one or more double bonds between carbon atoms in the fatty acids. ✓ (1)
- 2.4.3 **Two basic components of lipids.**
- Glycerol ✓
 - Fatty Acids ✓ (2)
- 2.4.4 **TWO roles of lipids in living organisms.**
- Energy storage ✓
 - Cell membrane structure ✓
 - Insulation ✓
 - Nutrient absorption ✓
 - Water proofing ✓
 - Protection ✓
 - Energy reserves ✓
 - Source of water ✓ (Any 2 x 1) (2)
- 2.5 2.5.1 **General formula of carbohydrates.**
- $C_nH_{2n}O_n$ ✓ (1)
- 2.5.2 **Bond that links the monomers of carbohydrates.**
- Glycosidic bond ✓ (1)
- 2.5.3 **Disaccharide found in milk**
- Lactose ✓ (1)
- 2.5.4 **TWO examples of carbohydrate polymers formed through glycosidic bonds.**
- Cellulose ✓
 - Starch ✓
 - Glycogen ✓
 - Chitin ✓
 - Lignin ✓ (Any 2 x 1) (2)

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QUESTION 3: SOIL SCIENCE

- 3.1 3.1.1 **The structure above.**
Soil texture triangle ✓ (1)
- 3.1.2 **Soil texture class**
(a) Clay (1)
(b) Loam (1)
(c) Sandy loam (1)
- 3.1.3 **Recommendation of the most suitable soil for crop production.**
Soil sample (b) ✓ (1)
- 3.1.4 **THREE reasons to motivate the answer in QUESTION 3.1.3**
 - It holds plenty of moisture but also drains well so that sufficient air can reach the roots. ✓
 - Has balanced composition of sand, silt and clay, creating a well-drained and nutrient-rich environment. ✓
 - Clay particles help retain water, preventing rapid drying, while the sand and silt allow excess water to drain, preventing waterlogging. ✓
 - The particle size distribution allows air and water to move freely, providing oxygen to roots and preventing compaction. ✓
 - Loam is generally rich in organic matter (humus), which provides essential nutrients for plant growth, including water-soluble minerals. ✓
 - Loam's structure is less dense than clay or silt, making it easier for farmers to till and prepare for planting. ✓(Any 3 x 1) (3)
- 3.2 3.2.1 **Soil structures in A and B**
A – Crumb/Spheroid ✓ (1)
B – Platy ✓ (1)
- 3.2.2 **Suggestion to the farmer regarding the soil structure that can be best utilised for maize crops.**
Soil structure A ✓ (1)
- 3.2.3 **TWO factors influencing the development and stability of soil structure.**
 - Soil colloidal matter in the soil ✓
 - Type of clay mineral/clay ✓
 - Climate ✓
 - Plant roots ✓
 - Microbial gum ✓
 - Organic matter ✓
 - Iron oxide ✓
 - Alternating moisture and drought ✓(Any 2 x 1) (2)

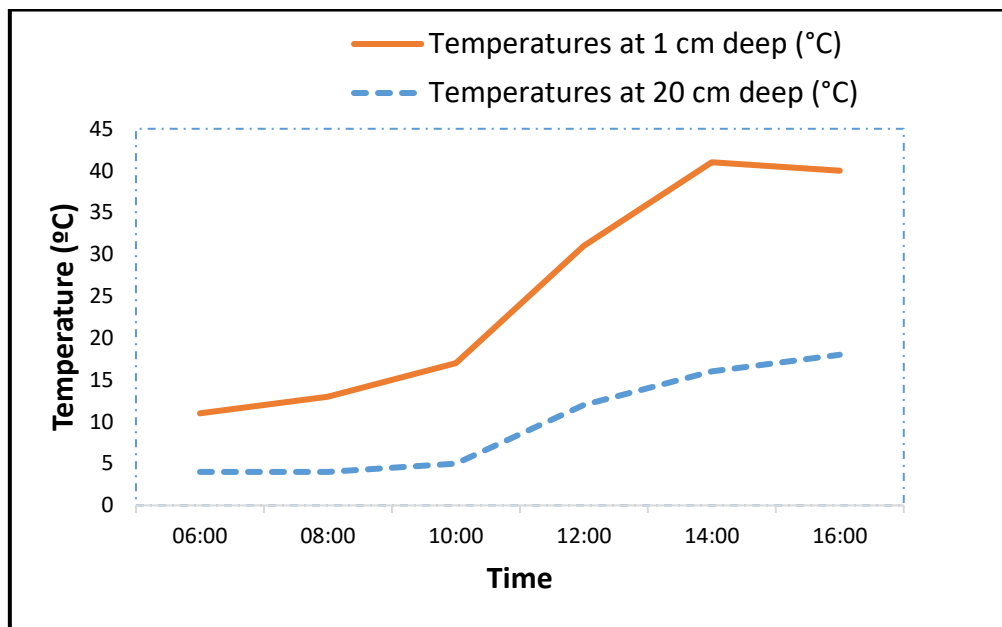
3.2.4 TWO advantages of a good soil structure.

- Prevents soil compaction ✓
- Prevents crusting ✓
- Prevents soil erosion ✓
- Limits effects of drought or excessive wetness and anaerobiosis ✓
- Prevents salt imbalances ✓

(Any 2 x 1) (2)

3.3 3.3.1 Soil temperature at different soil depths at different times.

(1)



(1)

Criteria/marketing guidelines

- Correct heading ✓
- X-axis – correctly calibrated and labelled (Time) ✓
- Y-axis – correctly calibrated and labelled (Temperature) ✓
- Correct units (°C) ✓
- Accuracy ✓
- Line graph ✓

(6)

3.3.2 Trend of soil temperature at 1 cm depth.

Soil temperature at 1 cm is higher ✓ than soil temperature at 20 cm at all times. ✓

(2)

3.3.3 TWO ways to minimise soil temperature variations.

- Soil surface cover/mulching ✓
- Shading ✓
- Irrigation ✓
- Clear plastic covers ✓

(Any 2 x 1) (2)

- 3.4 3.4.1 **Hypothesis from the experiment conducted.**
Infiltration rate in coarsely textured soils is higher ✓ than in finely textured soils. ✓ (2)
- 3.4.2 **Type of pores shown in SOIL SAMPLE A and B respectively.**
SOIL SAMPLE A – macro pores ✓ (1)
SOIL SAMPLE B – micro pores ✓ (1)
- 3.4.3 **Identification soil sample.**
(a) Clay soil - SOIL SAMPLE B ✓ (1)
(b) Sandy soil - SOIL SAMPLE A ✓ (1)
- 3.5 **Matching soil properties with the soil colour.**
- 3.5.1 C ✓ (1)
- 3.5.2 A ✓ (1)
- 3.5.3 B ✓ (1)
- 3.5.4 D ✓ (1)

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QUESTION 4: SOIL SCIENCE**4.1 4.1.1 Labels A and B.****A** – A-horizon ✓

(1)

B – E-horizon ✓

(1)

4.1.2 LETTERS describing the horizons.

(a) Illuvial horizon

C ✓

(1)

(b) Soft material and weathered rock

D ✓

(1)

4.1.3 Wet or waterlogged profile. $\frac{A}{G}$ ✓ **OR** $\frac{O}{G}$ ✓

(2)

4.1.4 Definition of a soil profile.

Vertical cross-section of the soil ✓ that reveals its soil horizons or layers. ✓

OR

Distinct layer in a soil profile, ✓ approximately parallel to the earth's surface, with characteristics that differentiate it from the layers above and below. ✓

(2)

4.2 4.2.1 TWO reasons why soils are classified.

- Choice of crop ✓
- Valuation of soil ✓
- Homogenous production units ✓
- Allocation of land ✓
- Optimal utilisation of land ✓
- Planning of farming activities ✓

(Any 2 x 1) (2)

4.2.2 Regions where the topsoil diagnostic horizons are found.(a) **Organic O-horizon**

Wet lands where organic matter accumulates ✓

(1)

(b) **Humic A-horizon**

Cool, moist regions ✓

(1)

4.2.3 Re-arrangement of the procedure**C** ✓**B** ✓**E** ✓**D** ✓**A** ✓

(5)

- 4.3 4.3.1 **Colloid representation.**
 (a) Brackish condition – **C** ✓ (1)
 (b) Acidic condition – **A** ✓ (1)
- 4.3.2 **Motivation of the answer in QUESTION 4.3.1.**
 (a) Na⁺ predominates ✓ (1)
 (b) H⁺ predominates ✓ (1)
- 4.3.3 **The method that can be used to reclaim the soil with the colloidal condition A.**
 Application of agricultural lime ✓ (1)
- 4.3.4 **Difference between *active* and *reserve* acidity.**
 Active acidity is caused by hydrogen ions in the soil solution ✓ while
 reserve acidity is caused by hydrogen ion (H⁺) bound onto soil colloids ✓ (2)
- 4.4 4.4.1 **TWO examples of micro-organisms found in the soil.**
 • Bacteria ✓
 • Protozoa ✓
 • Algae ✓
 • Fungi ✓
 • Nematodes ✓
 • Actinomycetes ✓ (Any 2 x 1) (2)
- 4.4.2 **TWO roles of soil micro- and macro-organisms.**
 • Break down plant and animal remains to release plant nutrients/
 decomposition of plant and animal residues. ✓
 • Improve the soil structure. ✓
 • While soil microbes are decaying plant material, carbon dioxide is
 released into the atmosphere. ✓
 • Certain soil microbes can bind the nitrogen in the atmosphere in the
 form of ammonium salts. ✓
 • Macro organisms, like earthworms open up the structure of the soil. ✓
 • Improve water retention capacity. ✓ (Any 2 x 1) (2)
- 4.5 4.5.1 **Nutrient cycle illustrated above.**
 Nitrogen ✓ (1)
- 4.5.2 **Indicate the labels A and B above.**
A – Nitrogen in the atmosphere ✓ (1)
B – Nitrification ✓ (1)
- 4.5.3 **LETTER matching the description.**
 (a) **D** ✓ (1)
 (b) **C** ✓ (1)
 (c) **E** ✓ (1)
 (d) **G** ✓ (1)

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TOTAL SECTION B: 105
GRAND TOTAL: 150