



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2020

**AGRICULTURAL SCIENCES P1
MARKING GUIDELINE
EXEMPLAR**

MARKS: 150

This marking guideline consists of 9 pages.

SECTION A**QUESTION 1**

- 1.1 1.1.1 C ✓✓
1.1.2 D ✓✓
1.1.3 C ✓✓
1.1.4 A ✓✓
1.1.5 C ✓✓
1.1.6 D ✓✓
1.1.7 A ✓✓
1.1.8 B ✓✓
1.1.9 D ✓✓
1.1.10 B ✓✓ (10 x 2) (20)
- 1.2 1.2.1 B only ✓✓
1.2.2 A only ✓✓
1.2.3 None ✓✓
1.2.4 B only ✓✓
1.2.5 Both A and B ✓✓ (5 x 2) (10)
- 1.3 1.3.1 Halogen ✓✓
1.3.2 Lewis structure ✓✓
1.3.3 Loam ✓✓
1.3.4 Nitrogen ✓✓
1.3.5 Colloid ✓✓ (5 x 2) (10)
- 1.4 1.4.1 Cation ✓
1.4.2 Hygroscopic ✓
1.4.3 Acid ✓
1.4.4 Mycorrhiza ✓
1.4.5 Illuviation ✓ (5 x 1) (5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: BASIC AGRICULTURAL CHEMISTRY****2.1 Compounds****2.1.1 Classification of compounds**

A – Organic ✓

B – Inorganic ✓

(2)

2.1.2 Reason

A – Presence of carbon atom ✓

B – Absence of carbon atom ✓

(2)

2.1.3 Name of compounds with the same molecular formula but different structure

Isomers ✓

(1)

2.1.4 Chemical formula of a compound represented by structure A• C₄H₁₀ ✓✓**OR**• CH₃ (CH₂)₂ CH₃ ✓✓

(2)

2.1.5 Identification of the letter

(a) C ✓

(b) B ✓

(2)

2.2 Matter/elements/compounds/mixtures**2.2.1 Identification of substances****A** – Compound ✓**B** – Homogeneous mixture ✓**C** – Heterogeneous mixture ✓

(3)

2.2.2 Difference between an element and a compound

Element is a substance that cannot be broken down by chemical means ✓

Compound is a substance formed when two or more elements are chemically combined ✓

(2)

2.2.3 Distinguishing between homogeneous and heterogeneous mixtures**Homogeneous** – mixture in which the dissolved solute cannot be separated from the solvent by physical means ✓**Heterogeneous** – mixture in which the components can be separated by physical means ✓

(2)

2.3 Fatty acids

2.3.1 Identification of the fatty acid

A – Unsaturated fatty acid ✓

B – Saturated fatty acid ✓

(2)

2.3.2 Indication of the letter representing the fatty acid

(a) Originating from plants – A ✓

(b) Solid at room temperature – B ✓

(c) Has a high melting point – B ✓

(d) Liquid at room temperature – A ✓

(4)

2.3.3 TWO importance of fats in living organisms

• Provide a source of stored energy ✓

• Source of insulation and temperature control ✓

• Vital part of membrane structure ✓

• Play a role in the flow of energy in and out of living cells ✓

• Assist in signal transduction ✓

(Any 2)

(2)

2.4 pH values

2.4.1 Indicating the pH of substances

Baking powder – Alkaline ✓

Orange juice – Acidic ✓

Milk – Neutral ✓

Battery acid – Strongly acidic ✓

(4)

2.4.2 Indicating the substance with a high concentration of

(a) **Hydroxide ion** – Baking powder ✓

(b) **Hydrogen ion** – Battery acid ✓

(2)

2.5 Monosaccharide

2.5.1 Names of the structures

A – Fructose ✓

B – Glucose ✓

(2)

2.5.2 Indication of the compound formed from fructose and glucose

Sucrose ✓

(1)

2.5.3 TWO elements that are basic composition of carbohydrates

• Carbon ✓

• Hydrogen ✓

• Oxygen ✓

(Any 2)

(2)

[35]

QUESTION 3: SOIL SCIENCE**3.1 Soil texture****3.1.1 Indication of the sample**

- (a) Sample B ✓
- (b) Sample A ✓
- (c) Sample B ✓
- (d) Sample A ✓

(4)

3.1.2 Commenting on the pore space of soil sample B by referring to bulk density

Soil sample B has a high bulk density / 3,2 g/cm³ ✓ and therefore lower pore space ✓

(2)

3.2 Soil structure**3.2.1 Identification of the structure**

- A – Platy ✓
- B – Prism-like/columnar/prismatic ✓
- C – Crumb/spheroid ✓

(3)

3.2.2 Indicating the letter representing the structure

- (a) A ✓
- (b) C ✓

(2)

3.2.3 TWO malpractices leading to the destruction of structure

- Flood irrigation ✓
- Cultivation of soil when it is too dry or wet ✓
- Ploughing and other tilling methods ✓
- Overgrazing / burning / removal of plant material ✓
- Movement of animals and equipment over wet soil ✓
- Irrigation leading to salt accumulation ✓

(Any 2) (2)

3.3 Soil moisture**3.3.1 Naming the term**

- A – Saturation point ✓
- B – Field water capacity ✓

(2)

3.3.2 Reason

- A – Soil is completely filled with water ✓
- B – Amount of water held in soil after saturation and drainage ✓

(2)

3.3.3 Plant response grown in soils in Container C and D

- (a) B – Plants will grow optimally ✓
- (b) C – Plants will wither/die ✓

(2)

3.3.4 Differentiation between *temporal* and *permanent wilting points*

Temporal wilting – The point when plants appear wilted only during the hottest part of the day and recover ✓

Permanent wilting – Plants do not recover from wilting ✓

(2)

3.4 Soil colour

3.4.1 Differentiation between *homogeneous* and *non-homogeneous* soil colour

Homogeneous – Single dominant colour in soil ✓

Non-homogeneous – Mixture of soil colours ✓ (2)

3.4.2 TWO factors determining the colour of soil

- Presence of water ✓
- Gleying conditions ✓
- Organic material ✓
- Presence of oxides ✓
- Presence of carbonates ✓

(Any 2) (2)

3.5 Soil gas

3.5.1 Indication of the gas deficient in experiment 1

Oxygen ✓ (1)

3.5.2 Role the gas could have played if not deficient

Influenced seed germination ✓ (1)

3.5.3 Gas high in soil as a result of activities in experiment 2

Carbon dioxide ✓ (1)

3.5.4 Reason for the high amount of carbon dioxide

Released during respiration ✓ of plant roots and soil micro – organisms ✓ (2)

3.6 Soil temperature

3.6.1 Indication of the letter

(a) A ✓

(b) C ✓

(c) A ✓

(3)

3.6.2 TWO methods to manipulate soil temperature

- Irrigation ✓
- Mulching ✓
- Clear plastic covers ✓
- Shading ✓

(Any 2) (2)

[35]

QUESTION 4: Soil science**4.1 Soil horizons****4.1.1 Sketching the soil profile**
$$\begin{array}{c} \underline{A} \\ \underline{B} \checkmark \checkmark \\ \underline{C} \\ \underline{R} \end{array}$$

(2)

4.1.2 Indication of the horizon

(a) E ✓

(b) G ✓

(2)

4.1.3 TWO diagnostic horizons of A horizon

- Humic ✓
- Vertic ✓
- Melanic ✓
- Orthic ✓

(Any 2) (2)

4.2 Soil classification**4.2.1 THREE reasons for classification of soil**

- Optimal utilisation of country's natural resources ✓
- Scientific planning of farm ✓
- Determining the crop production potential of the soil ✓
- Improved soil science communication ✓
- Development of new regions ✓
- Valuation of soils ✓

(Any 3) (3)

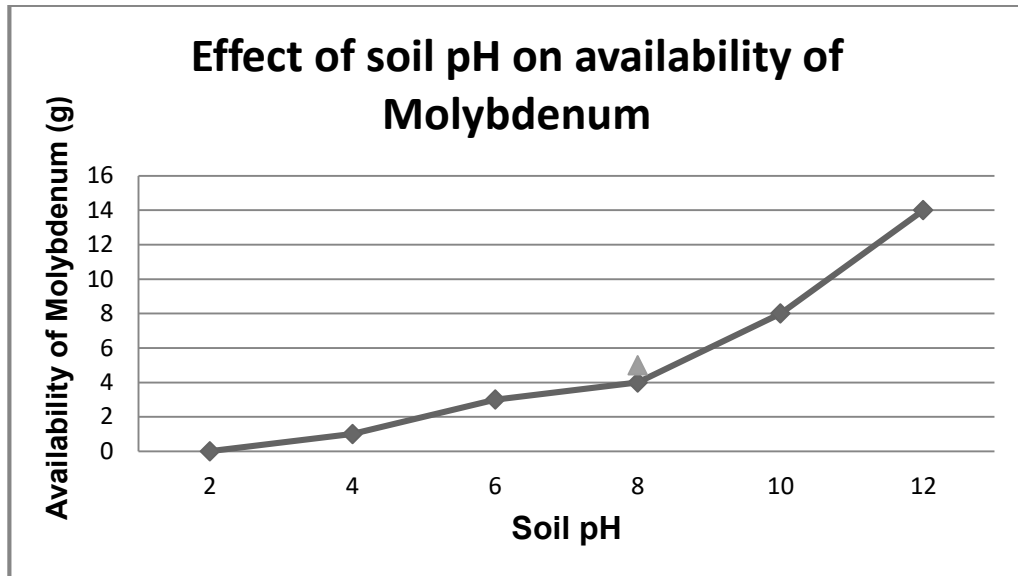
4.2.2 System used in South Africa to classify soil

Binomial system ✓

(1)

4.3 Soil pH

4.3.1 Line graph



Criteria/rubric/marketing guideline

- Correct heading ✓
 - X-axis : Correctly calibrated and labelled (Soil pH) ✓
 - Y-axis : Correctly calibrated and labelled (Availability of molybdenum) ✓
 - Line graph ✓
 - Accuracy ✓
 - Correct unit (g) ✓
- (6)

4.3.2 Deduction of the influence of acidity and alkalinity on the availability of molybdenum

- In acid soil/low pH molybdenum is not available ✓
- In alkaline soil / high pH molybdenum is more available ✓
- (2)

4.3.3 Measures to solve problems of:

- (a) **Decreased availability of molybdenum in soils with a pH of between 2 and 4**
Application of basic fertilisers such as lime/ CaCO_3 ✓
- (1)
- (b) **Toxic quantities of molybdenum in soil with pH of 14**
Application of gypsum/ CaSO_4 ✓
- (1)

4.4 Soil colloid

4.4.1 Deduction of the process

- A – Cation adsorption ✓
- B – Cation exchange ✓
- (2)

4.4.2 Reason for cation exchange

- Potassium cation from the soil solution exchanges with the hydrogen adsorbed in the colloid ✓
- (1)

- 4.4.3 **Indication of the hydrogen cation having an effect on plants**
Hydrogen in the soil solution ✓ (1)
- 4.4.4 **TWO types of colloids**
Organic colloid ✓
Inorganic colloid ✓ (2)
- 4.4.5 **Differentiation between *sodic* and *saline soils* with regard to dominant salts**
Sodic soil – Sodium carbonates ✓
Saline soil – Chlorides and sulphates of sodium, calcium and magnesium ✓ (2)
- 4.5 **Soil organisms**
- 4.5.1 **Classification of the worms into groups of soil organisms**
Macro-organisms ✓ (1)
- 4.5.2 **TWO conditions for the survival of worms**
- Organic nutrients ✓
 - Mineral nutrients (nitrogen/phosphorus/potassium) ✓
 - Soil moisture close to field water capacity ✓
 - Soil air for respiration ✓
 - Optimum temperature (temperature between 25 °C and 30 °C ✓
 - Optimum soil pH ✓ (Any 2) (2)
- 4.5.3 **Explanation of how worms will assist farmers**
- Break down plant and animal remains ✓ to liberate plant nutrients ✓
 - Improve soil structure ✓ for increased water retention capacity ✓
 - Worm casts is rich in organic matter ✓ which improves soil fertility ✓
 - Maintain CO₂ concentration ✓ which is used by plants during photosynthesis ✓ (Any 1) (2)
- 4.6 **Nutrient cycle**
- Nutrient cycle increasing nutrient content in plants**
- (a) **Protein content** – Nitrogen cycle ✓ (1)
- (b) **Carbohydrate content** – Carbon cycle ✓ (1)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150