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**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 10**

**NOVEMBER 2018**

**AGRICULTURAL SCIENCES P2  
MARKING GUIDELINE**

**MARKS: 150**

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This marking guideline consists of 8 pages.

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**SECTION A****QUESTION 1**

- |     |        |                                |          |      |
|-----|--------|--------------------------------|----------|------|
| 1.1 | 1.1.1  | B ✓✓                           |          |      |
|     | 1.1.2  | C ✓✓                           |          |      |
|     | 1.1.3  | A ✓✓                           |          |      |
|     | 1.1.4  | C ✓✓                           |          |      |
|     | 1.1.5  | C ✓✓                           |          |      |
|     | 1.1.6  | D ✓✓                           |          |      |
|     | 1.1.7  | A ✓✓                           |          |      |
|     | 1.1.8  | C ✓✓                           |          |      |
|     | 1.1.9  | C ✓✓                           |          |      |
|     | 1.1.10 | A ✓✓                           | (10 x 2) | (20) |
| 1.2 | 1.2.1  | E ✓✓                           |          |      |
|     | 1.2.2  | I ✓✓                           |          |      |
|     | 1.2.3  | F ✓✓                           |          |      |
|     | 1.2.4  | A ✓✓                           |          |      |
|     | 1.2.5  | B ✓✓                           | (5 x 2)  | (10) |
| 1.3 | 1.3.1  | Humidity ✓✓                    |          |      |
|     | 1.3.2  | Mono-cropping / monoculture ✓✓ |          |      |
|     | 1.3.3  | Fodder crops ✓✓                |          |      |
|     | 1.3.4  | Aeration ✓✓                    |          |      |
|     | 1.3.5  | Pods ✓✓                        | (5 x 2)  | (10) |
| 1.4 | 1.4.1  | Exotic/Alien ✓                 |          |      |
|     | 1.4.2  | Inversion ✓                    |          |      |
|     | 1.4.3  | Crusting ✓                     |          |      |
|     | 1.4.4  | Organ ✓                        |          |      |
|     | 1.4.5  | Salinity ✓                     | (5 x 1)  | (5)  |

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: SOIL SCIENCES****2.1 Description of soil components**

- 2.1.1 (a) Living organisms ✓ (1)
- (b) Organic matter / minerals ✓ (1)
- (c) Soil air ✓ (1)
- (d) Soil water ✓ (1)
- 2.1.2 **Bacteria synthesizing protein in roots**  
Nitrogen fixing / aerobic bacteria ✓ (1)
- 2.1.3 **Influence of fine texture on soil air movement**  
Presence of micro pores ✓ between soil particles result in a slow movement of air. ✓ (2)
- 2.1.4 **THREE functions of soil in an ecosystem**
- Soil anchors plants. ✓
  - Medium in which plant grows. ✓
  - Supply water, nutrients and air to the plants. / Cycle nutrients needed by plants. / Keeps the soil fertile by decomposing organic matter. ✓
  - Maintain soil structure.
  - Retain water in catchments.
  - Regulate soil and plant temperature.
  - Detoxifies the soil by helping with the suppression of pests, parasites and diseases. (Any 3 x 1) (3)
- 2.2 2.2.1 Secondary mineral ✓ (1)
- 2.2.2 **Examples of secondary minerals**
- Montmorillonite ✓
  - Kaolinite ✓
  - Haematite
  - Goethite
  - Gypsum (Any 2 x 1) (2)
- 2.2.3 **Physical structure of primary minerals**
- Hard ✓ / coarse ✓ (Any 1 x 1) (1)

2.2.4 Difference between *precious stones* and *soil nutrients*

Precious minerals	Soil nutrients
Minerals of economic and ornamental value ✓	Minerals required for the healthy growth of plants ✓

(2)

## 2.3 Mineral identification characteristics

2.3.1 Hardness ✓ (1)

2.3.2 Cleavage ✓ (1)

## 2.4 2.4.1 Types of chemical reactions

A – Hydrolysis ✓  
 B – Carbonation ✓ (2)

## 2.4.2 Explanation

A – Less soluble minerals react with water ✓ to form a new mineral that is softer and easier to weather. ✓ (2)

## 2.4.3 Product of respiration by soil microbes

- Water ✓
- Carbon dioxide (Any 1 x 1) (1)

## 2.4.4 Classes of igneous rocks

- Extrusive rocks ✓
- Intrusive rocks ✓
- Plutonic rocks ✓ (3)

## 2.5 2.5.1 Identification of the diagram

Soil profile ✓ (1)

## 2.5.2 Motivation

A succession of soil horizons ✓ in a vertical section ✓ through the soil is shown. (2)

## 2.5.3 Zone of illuviation

B horizon ✓ (1)

## 2.5.4 Justification of QUESTION 2.5.3

Compounds draining from above accumulate in B horizon ✓ (1)

## 2.5.5 Ions accumulating in podzol soils.

- Plant roots ✓
- Microbes ✓
- Burrowing animals (Any 2 x 1) (2)

## 2.6 2.6.1 Interpretation of the equation soil forming factors

A – O ✓ (1)

B – P ✓ (1)

**[35]**

**QUESTION 3: PLANT STUDIES**

- 3.1 3.1.1 **Classification of field crops**  
 A – Grain crops ✓  
 B – Oil seed crops ✓  
 C – Industrial crops ✓ (3)
- 3.1.2 **Definition of field crops**  
 Crops grown in large fields ✓✓ (2)
- 3.1.3 **Economic importance of maize**  
 • For making sugars, alcoholic drinks, sugar and syrups ✓  
 • Corn oil from maize seeds is used for making margarine and salad oil ✓  
 • Source of food for the people and livestock ✓ (3)
- 3.1.4 **Factors influencing successful crop production**  
 • Choose crops that are suitable for the climatic and soil conditions of an area ✓  
 • Plant crops at the right time of the year ✓  
 • Maintain correct sowing width / prepare seedbeds ✓  
 • Plant good quality seeds/plant seeds that are free from diseases  
 • Provide specific nutrients needed by crops to grow  
 • Ensure sufficient water supply  
 • Practice integrated pest management to control weeds, insects and diseases  
 • Erect windbreaks to protect crops from wind and to reduce evaporation and transpiration  
 • Harvest crops at the right time / use correct harvesting method  
 • Store harvested crops correctly  
 • Transport to carry crops must not damage them (Any 3 x 1) (3)
- 3.2 3.2.1 **Identification of fruit**  
 A – Grapes ✓  
 B – Avocadoes ✓  
 C – Citrus fruit ✓  
 D – Pine ✓ (4)
- 3.2.2 **Climatic requirements of bananas**  
 Warm climate / cannot tolerate cool or frosty winters / grow well between optimum temperatures 22 °C to 31 °C ✓ (Any 1 x 1) (1)
- 3.2.3 **Vitamins that bananas contain**  
 Vitamin B ✓  
 Vitamin C ✓ (2)

3.3 3.3.1 **Nutrient provided**

Protein ✓

(1)

3.3.2 **Quantity of hay produced from lucerne cultivated on 35 hectares of land by a dairy farmer from 2005 to 2010.**

Years of production	Bales of lucerne produced (kg)
2005/6	500
2006/7	1 000
2007/8	1 200
2008/9	2 950
2009/10	3 600

**Marking guideline for the table**

- Correct caption ✓
- Values for  $y$ -axis correctly labelled (Lucerne produced) ✓
- Values for  $x$ -axis correctly labelled (Years of production) ✓
- Units indicated in table (kg) ✓
- Table drawn ✓

(5)

3.3.3 **Trend**

Lucerne production is increasing ✓ with time ✓

(2)

3.3.4 **Quantity bales to be produced on 105 ha**

$$\frac{1\,000\text{ kg} \times 105\text{ ha}}{35\text{ ha}} \checkmark = 3\,000 \checkmark \text{ kg} \checkmark$$

(3)

3.4 3.4.1 **Legislation controlling invasive plants**

Conservation of Agricultural Resource Act, 1983 / CARA Regulation 15 and 16 ✓

(1)

3.4.2 **Reasons for growing protected trees**

- Trees are rare or threatened due to heavy use ✓
- Play a role in the functioning of the environment ✓
- Trees are of cultural or spiritual importance ✓

(3)

3.4.3 **Examples of protected forest trees**

- Real Yellowwood tree/*Podocarpus Latifolius* ✓
- Red Stinkwood/*Prunus Africana* ✓

(2)

**[35]**

**QUESTION 4: SUSTAINABLE NATURAL RESOURCE UTILISATION AND BIOLOGICAL CONCEPTS**

- 4.1 4.1.1 **Phenomenon displayed in the picture**  
Soil erosion ✓ (1)
- 4.1.2 **Impact of soil erosion to the environment**
- Reduction in arable land ✓
  - Loss of soil quality ✓
  - Siltation of dams (Any 2 x 1) (2)
- 4.1.3 **Preventative measures of soil erosion.**
- Allow vegetation in grazing fields to recover ✓
  - Sow cover crops ✓
  - Practise zero cultivation/no tilling ✓
  - Contour plough across slopes
  - Reduce ploughing before it rains (Any 3 x 1) (3)
- 4.1.4 **Causes of soil erosion**
- Overgrazing ✓
  - Mono cropping / mono culture ✓
  - Bad cultivation practices ✓
  - Wetland loss/damage
  - Ploughing the marginal land (Any 3 x 1) (3)
- 4.1.5 **Effects of incorrect disposal of agricultural waste on the soil**
- Rotting crop residues leach nutrients into the soil ✓
  - Buried toxic waste leaches into the soil ✓
  - Metal and glass are non-biodegradable ✓ (3)
- 4.2 4.2.1 **Source of water**  
Aquifer ✓ (1)
- 4.2.2 **Classification of a resource**  
Renewable ✓ (1)
- 4.2.3 **Management strategies of National Water Act**
- Setting up a national monitoring team ✓
  - Dividing the country into 19 water-management areas ✓
  - Registering and licensing of water use to the Department of Water Affairs ✓ (3)
- 4.3 4.3.1 **Types of cell divisions in representations A and B**  
A – Mitosis ✓  
B – Meiosis ✓ (2)
- 4.3.2 **Justification**  
A – Two daughter cells formed. ✓ (1)  
B – Four daughter cells formed. ✓ (1)



4.3.3	<b>Cells formed in diagram B</b> Sex cells / gametes ✓	(1)
4.3.4	<b>Cell division producing diploid cells</b> Diagram A / Mitosis ✓	(1)
4.3.5	<b>Life consequences without meiosis</b> <ul style="list-style-type: none"> <li>Sex cells/gametes will not be formed ✓</li> <li>No genetic variation of the species ✓</li> <li>Constant number of chromosomes from one generation to the next will not be provided ✓</li> <li>Infertility</li> </ul>	(Any 3 x 1) (3)
4.4	4.4.1 <b>Matching of the cell functions</b> <b>A</b> – Nucleus ✓ <b>B</b> – Ribosomes ✓ <b>C</b> – Cell membrane ✓ <b>D</b> – Cytoplasm ✓ <b>E</b> – Mitochondria ✓	(5)
4.4.2	<b>Definition of multicellular and unicellular organisms</b> <b>Multicellular</b> organisms – are organisms that contain many cells ✓ <b>Example</b> – Plants / animals / fungi ✓ <b>Unicellular</b> organisms – are organisms that consist of one cell ✓ <b>Example</b> – amoeba / bacteria / archaea / protozoa ✓	(2) (2) [35]
<b>TOTAL SECTION B:</b>		<b>105</b>
<b>GRAND TOTAL:</b>		<b>150</b>