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**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2017**

**AGRICULTURAL SCIENCES P1  
MARKING GUIDELINE**

**MARKS: 150**

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This marking guideline consists of 9 pages.

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

- |     |        |                            |               |
|-----|--------|----------------------------|---------------|
| 1.1 | 1.1.1  | A ✓✓                       |               |
|     | 1.1.2  | C ✓✓                       |               |
|     | 1.1.3  | C ✓✓                       |               |
|     | 1.1.4  | D ✓✓                       |               |
|     | 1.1.5  | B ✓✓                       |               |
|     | 1.1.6  | C ✓✓                       |               |
|     | 1.1.7  | B ✓✓                       |               |
|     | 1.1.8  | A ✓✓                       |               |
|     | 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  | Sucrose ✓✓                 |               |
|     | 1.3.2  | Catenate ✓✓                |               |
|     | 1.3.3  | Capillarity / Capillary ✓✓ |               |
|     | 1.3.4  | Bulk density ✓✓            |               |
|     | 1.3.5  | Mottled ✓✓                 | (5 x 2) (10)  |
| 1.4 | 1.4.1  | Ethanol ✓                  |               |
|     | 1.4.2  | Structure ✓                |               |
|     | 1.4.3  | Carbon dioxide ✓           |               |
|     | 1.4.4  | Hygroscopic / Adhesion ✓   |               |
|     | 1.4.5  | Immobilisation ✓           | (5 x 1) (5)   |

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: BASIC AGRICULTURAL CHEMISTRY****2.1 Organic compounds****2.1.1 Identification of compound and mixture**

A – compound ✓

(1)

B – mixture ✓

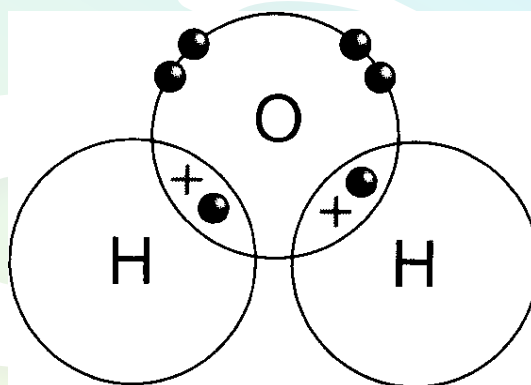
(1)

**2.1.2 Difference between A (*compound*) and B (*mixture*):**

- Constituent of a mixture can be separated by physical means ✓ and constituents of a compound cannot ✓
- Composition of a mixture can vary ✓ and composition of a compound is fixed ✓

(Any 1 x 2)

(2)

**2.1.3 Diagram showing chemical bond of water**Criteria for marking of the diagram:

1 mark – hydrogen atoms ✓

1 mark – oxygen atom ✓

1 mark – correct bonding with valence electrons ✓

(3 x 1)

(3)

**2.2 Fats / Lipids****2.2.1 Classification of food A and B**

A – Saturated fat ✓

(1)

B – Unsaturated fat ✓

(1)

**2.2.2 Identification of fat to be included in a diet**

Unsaturated fat / fat in food B / Sunflower oil ✓

(1)

**2.2.3 Reason for fat included in a diet**

It is of plant origin ✓ and can lower cholesterol levels in blood/ lowers risk of heart attack ✓ / Lowers risk of some cancers ✓

(Any 2)

(2)

## 2.2.4 Distinguishing between food A and food B

(a) **Melting point** – Food A – has a high melting point ✓  
 Food B – has a low melting point ✓ (2)

(b) **Bond between carbon atoms**

Food A – single bond between carbon atoms ✓  
 Food B – double bond between carbon atoms ✓ (2)

## 2.3 Protein

## 2.3.1 Building block of protein

Amino acids ✓ (1)

2.3.2 Difference between *simple* and *complex protein*

- Simple proteins only yield amino acids if broken down ✓
- Complex proteins are simple proteins combined with some non-protein material ✓ (2)

## 2.3.3 Reason for giving animals protein in each of the following situation:

- (a) Racing horse – It builds collagen structures which give strength to the animal ✓ (1)
- (b) Injured animal – It repairs worn out and damaged cells ✓ (1)
- (c) Newly born animal – Needed for the development of new cells /growth ✓ (1)

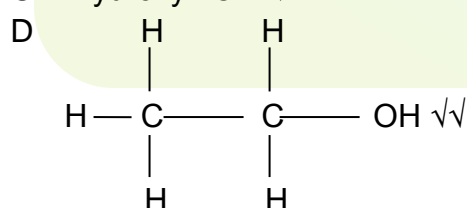
## 2.4 Organic compound

## 2.4.1 Providing labels

A - Propane ✓

B –  $C_3H_8$  ✓

C – Hydroxyl/ OH ✓



E – Ethanoic acid ✓

F – Carboxyl /  $\text{COOH}$  ✓

G –  $\text{CH}_3$  ✓  $\text{COOH}$  ✓ (9)

## 2.4.2 Importance of Ethanoic acid

- It is used to preserve food ✓ (1)

**2.5 Carbohydrates****2.5.1 Classification of food into carbohydrate types**

Potatoes – Polysaccharide ✓

Sugar – Monosaccharide ✓

(2)

**2.5.2 Chemical formula of the monosaccharide** $C_6H_{12}O_6$  ✓

(1)

**[35]****QUESTION 3: SOIL SCIENCE****3.1 Soil texture****3.1.1 Determination of percentage of sand and clay**

(a) Clay loam: Sand between 31% – 45% ✓

Clay between 21% – 39% ✓

(2)

(b) Silt loam: Sand between 12% – 45% ✓

Clay between 5% – 18% ✓

(2)

**3.1.2 Influence of clay on the following:**

(a) Tillability of soil – Clay soil is hard to till ✓ because of cohesive forces ✓

(2)

(b) Drainage of soil – Drainage of soil with a high clay content is low ✓ due to micro-pores ✓

(2)

**3.1.3 Indication of texture ideal for cultivation**

Loam ✓

(1)

**3.2 Handling facility****3.2.1 Formulation of hypothesis**

In clay soil water moves slowly ✓ to reach the greatest height ✓

**OR**

Sandy soil has a low capillarity ✓ than clay soil/ vice versa ✓

(Any 1 x 2)

(2)

**3.2.2 Type of water movement demonstrated**

Capillary movement / Capillarity ✓

(1)

**3.2.3 Labelling of soils****Soil A** – Clay ✓**Soil B** – Sand ✓**Soil C** – Loam/silt ✓

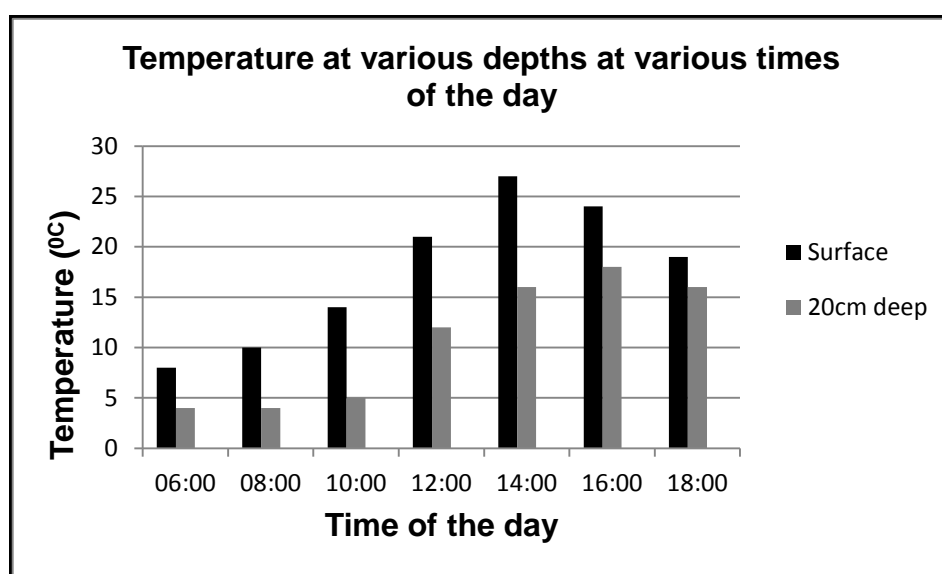
(3)

3.2.4 **Indicating the soil where the following occurs**

- (a) **Water rises most rapidly** – Sand ✓ (1)
- (b) **Water rises the slowest** – Clay ✓ (1)

3.2.5 **Reason for the answer**

The rapid rise of water in sandy soil is the result of a large number of macro-pores which allow rapid water movement ✓ and the micro-pores in clay retard the motion of water ✓ (2)

3.3 **Soil temperature**3.3.1 **Bar graph****Criteria/rubric/marketing guidelines**

- Correct heading ✓
- X-axis: Correctly calibrated with label (Time of the day) ✓
- Y-axis: Correctly calibrated with label (Temperature) ✓
- Correct unit (°C) ✓
- Correct type of graph (Bar graph) ✓
- Correct plotting ✓ (6)

3.3.2 **Identification of the problem of temperature on the surface**

Temperature variation is high ✓ (1)

3.3.3 **TWO ways to minimise the situation**

- Mulching/surface cover material ✓
- Shading ✓
- Clear plastic covers ✓
- Irrigation ✓ (Any 2 x 1) (2)

## 3.4 Indication of the cause of soil colours

3.4.1 **Black** – Presence of organic matter ✓ (1)

3.4.2 **Red** – Oxidised iron ✓ (1)

3.4.3 **Grey** – Waterlogged soil condition ✓ (1)

## 3.5 Pore space

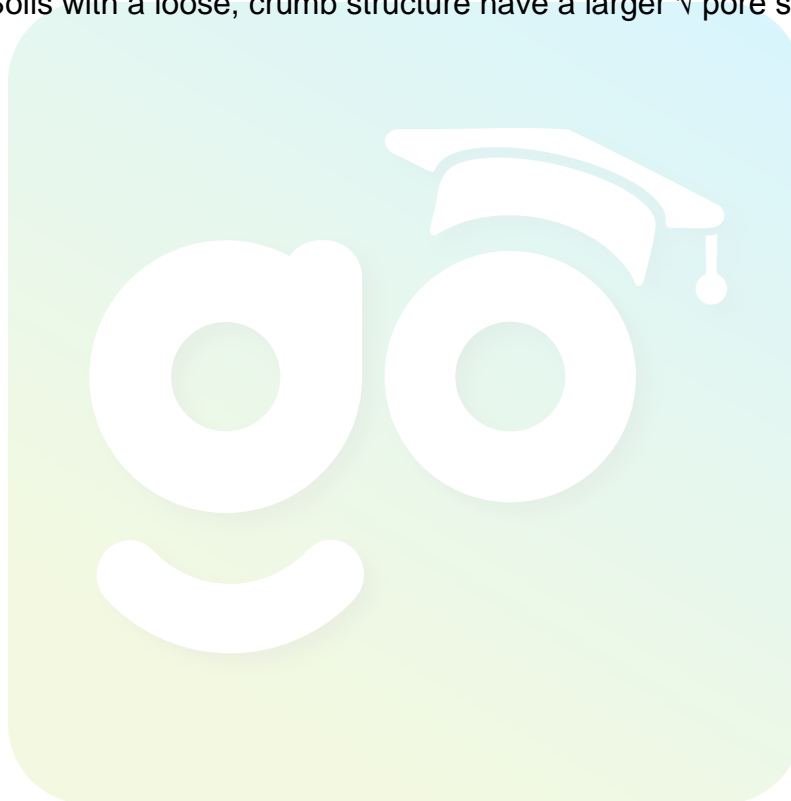
### 3.5.1 Influence of soil depth on pore space

Total pore space decreases ✓ with an increase in soil depth ✓ (2)

### 3.5.2 Influence of crumb structure on pore space

Soils with a loose, crumb structure have a larger ✓ pore space ✓ (2)

[35]





**QUESTION 4: SOIL SCIENCE****4.1 Soil morphology****4.1.1 Identification of soil profiles**

A – Young soil ✓

B – Adult soil ✓

C – Wet soil ✓

D – Eroded soil ✓

(4 x 1) (4)

**4.1.2 Naming of the horizon**

(a) B horizon ✓

(b) A horizon ✓

(c) C horizon ✓

(3)

**4.2 Soil classification****4.2.1 Re-arrangement of steps in soil classification**

- Demarcate master horizons ✓
- Identify diagnostic horizons ✓
- Establish soil form ✓
- Series characteristics are identified ✓
- Determine soil series ✓

(5 x 1) (5)

**4.2.2 Explanation of a binomial soil classification**

Soil classification contains two categories i.e. broad and a more general level soil form ✓ and a lower and more specific level soil series ✓

(2)

**4.3 Soil organisms****4.3.1 Classification of organisms in pictures A and B****Picture A** – micro-organisms ✓**Picture B** – macro-organisms ✓

(2)

**4.3.2 THREE conditions needed for the survival of these organisms**

- Soil fertility ✓
- Soil moisture ✓
- Suitable soil temperature ✓
- Soil aeration ✓
- Light ✓
- Soil pH ✓

(Any 3 x 1) (3)

**4.3.3 Explanation of how the organisms improve the following:**

- (a) **Soil structure** – Secretions of these organisms ✓ help with the aggregation of soil particles ✓ (2)
- (b) **Soil fertility** – They release carbon dioxide which reacts with water to form carbonic acid ✓ which aids in the release of plant nutrients ✓

**OR**

- They break down plant and animal remains ✓ to release nutrients ✓ (2)

**4.4 Soil alkalinity and salinity****4.4.1 Prediction of the soil pH****Farm A** – above 8,5 ✓**Farm B** – between 7,5 and 8,5 ✓ (2)**4.4.2 Indication of the common terms describing pH levels****Farm A** – alkalinity ✓**Farm B** – salinity ✓ (2)**4.4.3 Salts predominating in Farm A soil**

Sodium carbonates and bicarbonates ✓ (1)

**4.4.4 TWO measures to correct condition of soil in farm A**

- Adding gypsum ✓
  - Scraping ✓
  - Flushing ✓
  - Leaching ✓
- (Any 2 x 1) (2)

**4.5 Soil colloids****4.5.1 Example of organic colloid**

Humus ✓ (1)

**4.5.2 Differentiation between organic and inorganic colloids with regard to shape**

- Inorganic colloids have a layered structure with flat platelets ✓
  - Organic colloids are structureless/ amorphous ✓
- (2)

**4.5.3 Explanation of how organic and inorganic colloids improve soil fertility**

They are negatively charged ✓ and attract positively charged ions/ nutrients ✓ (2)

**[35]****TOTAL SECTION B: 105****GRAND TOTAL: 150**