Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2017

AGRICULTURAL SCIENCES P1 MARKING GUIDELINE

MARKS: 150

This marking guideline consists of 9 pages.

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

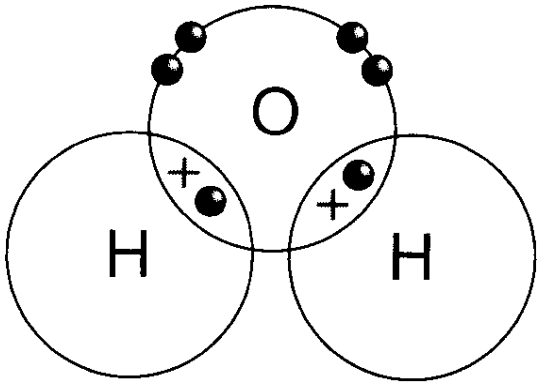
2.1.1 Identification of compound and mixture

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)

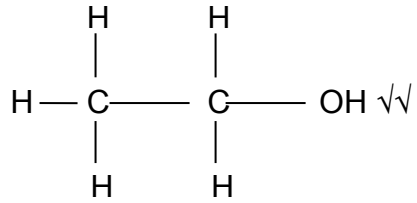
2.3.3 **Reason for giving animals protein in each of the following situation:**

(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 √
D



E – Ethanoic acid √
F – Carboxyl / COOH √
G – CH_3 √ 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)
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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)

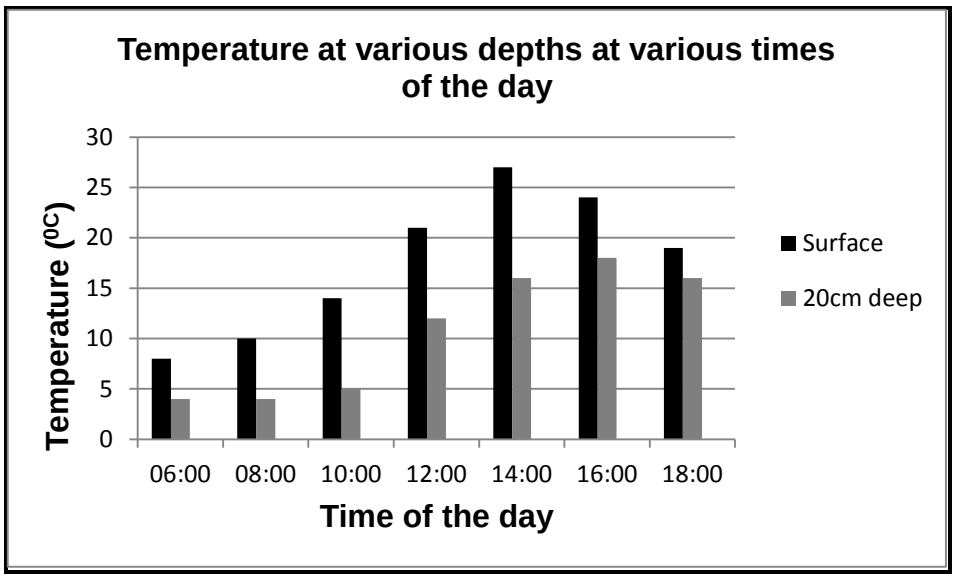
(b) **Water rises the slowest** – Clay √ (1)

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/marking 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)
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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)

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TOTAL SECTION B: 105

GRAND TOTAL: 150