



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

AGRICULTURAL SCIENCES P1

NOVEMBER 2007

MEMORANDUM

This memorandum consists of 7 pages.

SECTION A / AFDELING A**QUESTION 1.1 / VRAAG 1.1**

1.1.1	A	B	X	D
1.1.2	A	B	X	D
1.1.3	X	B	C	D
1.1.4	X	B	C	D
1.1.5	A	B	X	D
1.1.6	A	X	C	D
1.1.7	X	B	C	D
1.1.8	A	X	C	D
1.1.9	A	B	C	X
1.1.10	X	B	X	D

QUESTION 1.2 / VRAAG 1.2

1.2.1	X	B	C	D
1.2.2	A	X	C	D
1.2.3	X	B	C	D
1.2.4	A	X	C	D
1.2.5	A	B	X	D

QUESTION 1.4 / VRAAG 1.4

1.4.1	Colloids A. Acid B. Neutral / Sweet C. Alkaline / Brackish	(3)
1.4.2	pH measurement A. Less than 7 C. More than 7	(2)

QUESTION 1.3 / VRAAG 1.3

- 1.3.1 Proteins / Amino acids
1.3.2 Adsorb
1.3.3 Carbon dioxide
1.3.4 Colloidal dispersion
1.3.5 Lignin / Cellulose
1.3.6 Substrata / C Horison
1.3.7 Bulk density / density
1.3.8 Smaller
1.3.9 B Horison
1.3.10 Free / Seepage /
Gravitational

[5]

Total: [45]

SECTION B**QUESTION 2: BASIC CHEMISTRY**

- 2.1 2.1.1 Chemical characteristics of water
- Made up of one atom of oxygen and two atoms of hydrogen
 - Most effective solvent
 - It is a polar molecule which has a slight negative charge✓ at the oxygen end and a slightly positive charge✓ at the hydrogen end
 - Salts that dissolve in water ionise (form ions) ✓
 - + charged ions attach to the side of oxygen on the water molecule✓
 - - charged ions attach to the side of hydrogen on the water molecule✓
 - it form a homogenous solution✓
- (6)
- 2.2 2.2.1 • Flocculation of particles will take place ✓
- Scattered colloidal particles will group together ✓
 - and filter down under the influence of gravity✓ because
 - the electrical charges on the water molecule are neutralised✓
 - aggregates will form✓
 - The colour will turn into a clear solution✓
- (any 2) (2)
- 2.2.2 Colloidal dispersion. ✓✓ (2)
- 2.2.3 Homogenous and heterogeneous mixtures.
- Homogenous mixtures: a type of mixture in which the two components✓ are occur evenly spread in the solution and they appear in one phase✓
 - Heterogeneous mixtures: Mixtures that consists of clearly distinguishable components✓ which are not evenly spread in the solution✓
- (4)
- 2.3 Organic compounds.
- 2.3.1 C✓ (1)
- 2.3.2. F✓ + D✓ (2)
- 2.3.3. A✓ (1)
- 2.3.4 B✓ / fructose✓ (1)
- 2.3.5 Condensation / dehydration synthesis✓✓ (2)
- 2.3.6 Polypeptide /Sistine / Amino acid / di-peptide✓✓ (2)
- 2.4. Carbohydrate Groupings.
- Monosaccharides✓ - glucose/fructose/galactose✓
 - Disaccharides✓ -maltose/lactose/sucrose✓
 - Polysaccharides✓ -starch/cellulose/glycogen/dextrin✓
- (6)
- 2.5 Chemical reactions
- 2.5.1. Alcohol beverage companies/ Breweries / Cellars / Bio feul companies (1)

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2.5.2. Fermentation process during which ethanol✓ is formed by the action of micro organisms. ✓ / Yeast cells changes glucose to alcohols✓ during anaerobic respiration✓. (2)

2 5.3 Ethanol is oxidised✓ to form an organic acid✓ / the formation of acetic acid✓ (vinegar) after alcohols have been oxidised✓ / ethanol will evaporate✓✓ (2)

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QUESTION 3: SOIL SCIENCE: Classification, profile and characteristics.

- 3.1 Soil classification – Necessity
- For optimal use of the countries natural resources like soil ✓ and water, by practicing the correct production line and cultivation practices and determining the potential of these resources✓
 - For the scientific planning of the farm✓ in terms of water control use and distribution, physical planning of the farm✓
 - Classification of different soil types in a country
 - For the development of new areas for agricultural production (4)
- 3.2 Profile combinations.
- Eroded soil
 - Wet soil
 - Old/mature soil / Ideal soil
 - Young soil / Shallow soil (4)
- 3.3 Comparison of sugarcane farms
- 3.3.1 Farm B, has granular type of structure which act as a sponge / has more micro pores **or**
Farm A, it has a more clay structure which is typical for a prismatic structure (2)
- 3.3.2 Farm A, consists of prismatic type of structure which lacks oxygen / soil is very shallow / greyish colours indicate saturated conditions / no drainage (2)
- 3.3.3 Farm B (1)
- 3.3.4 Farm B (1)
- 3.3.5 THREE reasons-high production:
- Has good water retention capacity because of the granular structure
 - Rich in organic matter which is visible in the dark colour
 - Absorbs more heat because of the dark colour
 - Its depth allows it for most crop cultivation (4)
- 3.4 THREE characteristics of soil
- Age of the soil
 - Drainage properties
 - Organic matter content
 - Aeration status
 - Parent rock (Any 3) (3)
- 3.5 3.5.1 Sun radiation in the southern hemisphere✓ on reach the soil from the north. The northern slope will receive more radiation than the southern slope✓, the radiation reaches the soil at a more perpendicular angle✓ on the slope which makes it warmer. ✓ (4)
- 3.5.2 Crops on the northern slope will ripen earlier than crops growing on a southern slope.✓✓ (2)
- 3.5.3 Crops on a southern slope will need to be more resistant✓ to cooler conditions✓, wetter conditions and be more shade tolerant. ✓ (any 2) (2)
- 3.6 3.6.1 Loamy soil✓ (1)

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- 3.6.2 Sandy soils has more✓ macro pores✓ than a clay soil which lead to better aeration and water flow (seepage). ✓ (3)
- 3.6.3 By adding organic material✓ and using mulching practices✓. (2)

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QUESTION 4: Chemical, colloidal properties and microbiology

4.1 Complete the following table by comparing saline and sodic soils

	Saline soils	Sodic soils	
PH conditions	Less than 8.5	Above 8.5	(2)
Dominant salts	Chlorides and sulphates of sodium, calcium and magnesium	Carbonates and Bicarbonates of Sodium salts	(2)
Surface appearance	Powdery with white crust formed	Appears black	(2)
Effects on the soil and plant growth	-High osmotic pressure -Decreased accessibility of soil water to plants -Toxicity to plants results -bare patches occur	-Harmful to plants -Soil becomes structure less -Humus is removed -Very strong developed prismatic structure	(6)

4.2. Active Acidity

- Result of presence of hydrogen ions in the soil solution

Reserve/residual acidity

- Result of adsorbed hydrogen and aluminium ions on the soil colloid (3)

4.3. Importance of micro organisms

- Decompose organic matter in the soil
- Improve soil fertility
- Increase the amount of nutrients in the soil
- Maintains carbon dioxide concentration
- Traps nitrogen from the air in the form of ammonium salts
- Improves the structure of the soil
- Nitrogen fixation
- Live mutually with plants
- Essential for processing of certain foods
- Transformation of other essential elements (Any 6) (6)

4.4 Chemical influence of organic matter.

- High cation adsorption capacity and therefore increased soil fertility
- Increases the supply of accessible nitrogen compounds in the soil
- Decay of organic matter leads to the release of other nutrients in the soil
- Acids released react with reserve plant nutrients in the soil making them more available to the plants
- Chemical reactions take place more rapidly leading to increased soil fertility (Any 3) (6)

4.5

Soil colloids

	Properties	Organic	Inorganic	
4.5.1	Examples	Humus	Illite, vermiculite, chloride, kaolinite or Montmorillonite	(2)
4.5.2	Shape	Amorphous	Layered / compacte form	(2)
4.5.3	Charge	Negative	Negative	(2)
4.5.4	Surface area	Extremely large	Tremendously large	(2)

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TOTAL SECTION B [105]
TOTAL PAPER [150]