****Province of the

**EASTERN CAPE**

EDUCATION

**NATIONAL**

**SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2010**

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| **AGRICULTURAL SCIENCES – PAPER 1**  **MEMORANDUM** |

**MARKS: 150**

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| This memorandum paper consists of 7 pages. |

**SECTION A**

**Question 1.1 Question 1.3**

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

* + 1. Homogeneous √√
    2. Neutralisation √√
    3. Hydrolysis √√
    4. Water / moisture √√
    5. Ethanoic acid / vinegar √√

(5 x 2) (10)

(10 x 2) (20)

**Question 1.2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | ONLY  A | ONLY  B | A and B | None |
| 1.2.1 | A | B | C | D |
| 1.2.2 | A | B | C | D |
| 1.2.3 | A | B | C | D |
| 1.2.4 | A | B | C | D |
| 1.2.5 | A | B | C | D |

(5 x 2) (10)

|  |  |  |  |
| --- | --- | --- | --- |
| **Question 1.4** | | |  |
| 1.4.1 | Amino acids√ |
| 1.4.2 | Leaching√ |
| 1.4.3 | Rhizobium / root-nodule√ |
| 1.4.4 | Carbonic√ |
| 1.4.5 | Adsorption √ |

(5 x 1) (5)

**TOTAL SECTION A: 45**

|  |  |  |  |
| --- | --- | --- | --- |
| **SECTION B** | | |  |
|  | | |  |
| **QUESTION 2** | | |  |
|  | | |  |
| 2.1 | **Scenario** | |  |
|  |  |  |  |
|  | 2.1.1 | Fatty acids in which all carbon atoms are connected √ by single covalent bonds. √ | (2) |
|  |  |  |  |
|  | 2.1.2 | * Decreased blood cholesterol √ * Reduced incidence of high blood pressure √ * Reduction in the number of patients with stroke √ * Reduced heart attacks √ * General good health of mankind √ (Any 3 x 1) | (3) |
|  |  |  |  |
|  | 2.1.3 | Hydrogenation √ | (1) |
|  |  |  |  |
|  | 2.1.4 | Oleic acid / linoleic acid / arachidonic acid √ | (2) |
|  |  |  |  |
| 2.2 | **Soil temperature** | |  |
|  |  |  |  |
|  | 2.2.1 | * Moisture content of soil/water content/specific heat capacity √ * Slope / gradient / orientation of land aspect √ * Vegetation and ground cover √ * Radiation and reflection of sun’s energy from the surface of the land √ * Photoperiod of daylength √ * Distance from the equator √ * Soil depth √ * Soil colour √ (Any 4 x 1) | (4) |
|  |  |  |  |
|  | 2.2.2 | * Seeds germinate faster √ * Increased microbial activity to release plant nutrients √ * Optimum production of crops √ * Plant growth is rapid and soil deliver early crops √ * Chemical reactions in soil are enhanced √ * Soil water dissolves more plant nutrients √ (Any 4 x 1) | (4) |
|  |  |  |  |
| 2.3 | **Soil Reaction** | |  |
|  |  |  |  |
|  | 2.3.1 | K+√and Na+ √ | (2) |
|  |  |  |  |
|  | 2.3.2 | H+√ and Al+3 √ | (2) |
|  |  |  |  |
|  | 2.3.3 | Ca+2 √ and Mg+2 √ | (2) |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 2.4 | **Soil organic matter** | | | |  |
|  |  |  | | |  |
|  | 2.4.1 | C √ -- Oxygen √ | | | (2) |
|  |  |  | | |  |
|  | 2.4.2 | A √ -- Carbon dioxide √ | | | (2) |
|  |  |  | | |  |
|  | 2.4.3 | B √ -- Nitrogen √ | | | (2) |
|  |  |  | | |  |
|  | 2.4.4 | C √ -- Oxygen √ | | | (2) |
|  |  |  | | |  |
| 2.5 | **Soil Profile** | | | |  |
|  |  |  | | |  |
|  | 2.5.1 | * O-horizon √ * A-horizon √ * B-horizon √ | | | (3) |
|  |  |  | | |  |
|  | 2.5.2 | * C-horizon √ * R-horizon √ | | | (2) |
|  |  |  | | | **[35]** |
|  |  |  | | |  |
| **QUESTION 3** | | | | | |
|  |  |  | | |  |
| 3.1 | **Soil Texture** | | | |  |
|  |  |  | | |  |
|  | 3.1.1 | Clay √√√ | | | (3) |
|  |  |  | | |  |
|  | 3.1.2 | * Improves aeration √ * Improves infiltration rate √ * Decreases erosion √ * Enhances soil cultivation √ * Improves absorption of heat by soil √ * Improves water retention/holding √ * Improves soil structure √ (Any 4 x 1) | | | (4) |
|  |  |  | | |  |
|  | 3.1.3 | **Property** | **Clay** | **Sand** |  |
|  |  | Water retention | **High** √ | **Low** √ |  |
|  |  | Ease of tillage | **Poor** √ | **Good** √ |  |
|  |  | Infiltration capacity | **Poor (low)** √ | **High (good)** √ | (6) |

|  |  |  |  |
| --- | --- | --- | --- |
| 3.2 | 3.2.1 | * Absence of carbon dioxide √ * No photosynthesis √ * No organic compounds √ * No fuel (e.g.: petrol, paraffin, etc) √ * Lipids * Carbohydrates * Proteins * Vitamins * Any organic compound * No plant life √ * No animal life √ * Extinction of living organisms √ (Any 5 x 1) | (5) |
|  |  |  |  |
|  | 3.2.2 | * Fungi √ * Bacteria √ * Actinomycetes √ * Protozoa √ * Viruses **√** (Any 3 x 1) | (3) |
|  |  |  |  |
| 3.3 | **Organic and Inorganic compounds** | |  |
|  |  |  |  |
|  | 3.3.1 | B √ – CaCO3 √ | (2) |
|  |  |  |  |
|  | 3.3.2 | A √  H H √√    H – C – C – OH  H H | (3) |
|  |  |  |  |
|  | 3.3.3 | Carboxyl (COOH) group √ | (1) |
|  |  |  |  |
|  | 3.3.4 | D √ | (1) |
|  |  |  |  |
|  | 3.3.5 | F / Sodium carbonate / Na2CO3 √√ | (2) |
|  |  |  |  |
|  | 3.3.6 | C √ | (1) |
|  |  |  |  |
| 3.4 | **Symbiotic Nitrogen fixation** | |  |
|  |  |  |  |
|  | 3.4.1 | Aerobic √ | (1) |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 3.4.2 | * Optimum soil temperature √ * Optimum soil pH / reaction √ * Nitrogen content of the soil √ * Nutrient elements in the soil √ * Type of legume √ * Population / numbers of rhizobium bacterial in the soil √ * Type of rhizobium species √ (Any 2 x 1) | (2) |
|  |  |  | **[35]** |
|  |  |  |  |
| **QUESTION 4** | | |  |
|  |  |  |  |
| 4.1 | **Soil Water** | |  |
|  |  | |  |
|  | 4.1.1 | * Micro-pores/tiny pores/small pores/capillary pores √ * Macro-pores/big pores/larges pores/non-capillary pores √ | (2) |
|  |  |  |  |
|  | 4.1.2 | Micro-pores √ | (1) |
|  |  |  |  |
|  | 4.1.3 | * Texture √ * Temperature √ * Organic matter content √ * Soil structure √ * Drainage of sub-soil √ (Any 4 x 1) | (4) |
|  |  |  |  |
|  | 4.1.4 | The tendency / ability of water molecules to move √ from a solution into another solution √ through a semi-permeable membrane. √ | (3) |
|  |  |  |  |
|  | 4.1.5 | * Serves as a solvent √ * Medium for chemical reactions √ * Medium for transport √ * Reactant during photosynthesis √ * Regulates temperature of plant through evaporation √ * Maintains shape of plants through turgidity/Gives mechanical strength to plants √ (Any 4 x 1) | (4) |
|  |  |  |  |
| 4.2 | **Soil Structure** | |  |
|  |  |  |  |
|  | 4.2.1 | Crumb √ | (1) |
|  |  |  |  |
|  | 4.2.2 | * Enhances drainage √ * Decreases compaction of soils/easy root penetration √ * Promotes aeration √ * Makes clay soils lighter and less sticky √ * Reduces soil erosion √ * Increases the water-holding capacity/water retention of sandy soils √ (Any 5 x 1) | (5) |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 4.2.3 | * Climate √ * Wetting and drying √ * Type of clay mineral present √ * Plant roots √ * Colloidal matter in the soil √ (Any 2 x 1) | (2) |
|  |  |  |  |
|  | 4.2.4 | * Over-cultivation √ * Impact of raindrops/Batter action of raindrops √ * Cultivating soil when too wet or too dry √ * Reduction of organic matter content of soil √ * Flood-irrigation √ * Smearing action during ploughing √ (Any 3 x 1) | (3) |
|  |  |  |  |
| 4.3 | **Soil classification** | |  |
|  |  |  |  |
|  | 4.3.1 | * Texture √ * Lime content/calcium content √ * Organic matter content √ * Soil colour √ * Base status √ * pH/soil reaction √ * Nature of sub-soil material √ (Any 4 x 1) | (4) |
|  |  |  |  |
|  | 4.3.2 | * Dark-coloured soil * Has high percentage of organic matter √ * High water-retention capacity √ * Very fertile √ * More warmer √ (Any 2 x 1) * Suitable for all crops √ (1) |  |
|  |  |  |  |
|  |  | * Light-coloured soil * Formed from sandstone √ * Low water-retention capacity √ * Lower organic matter content √ * Cooler √ (Any 2 x 1) * Suitable for crops which need light but deep soils √ (1) | (6) |
|  |  |  | **[35]** |
|  |  |  |  |
|  |  | **TOTAL SECTION B:** | **105** |
|  |  |  |  |
|  |  | **GRAND TOTAL:** | **150** |