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**GRADE 11**

**NOVEMBER 2015**

**AGRICULTURAL SCIENCES P1  
MEMORANDUM**

**MARKS: 150**

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This memorandum consists of 6 pages.

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**SECTION A****QUESTION 1****1.1 MULTIPLE-CHOICE QUESTIONS**

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

(10 x 2) (20)

**1.2 COLUMN A/COLUMN B**

- 1.2.1 B ✓✓
- 1.2.2 A ✓✓
- 1.2.3 B ✓✓
- 1.2.4 Both A and B ✓✓
- 1.2.5 None ✓✓

(5 x 2) (10)

**1.3 ONE WORD/TERM**

- 1.3.1 Molecule ✓✓
- 1.3.2 Solubilisation ✓✓
- 1.3.3 Saturation point ✓✓
- 1.3.4 Soil imbalances ✓✓
- 1.3.5 Platy ✓✓

(5 x 2) (10)

**1.4 CHANGE THE UNDERLINED WORDS**

- 1.4.1 Polysaccharide ✓
- 1.4.2 Isomers ✓
- 1.4.3 Trans-amination ✓
- 1.4.4 Non-homogeneous ✓
- 1.4.5 Exchange capacity ✓

(5 x 1) (5)

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: BASIC AGRICULTURAL CHEMISTRY**

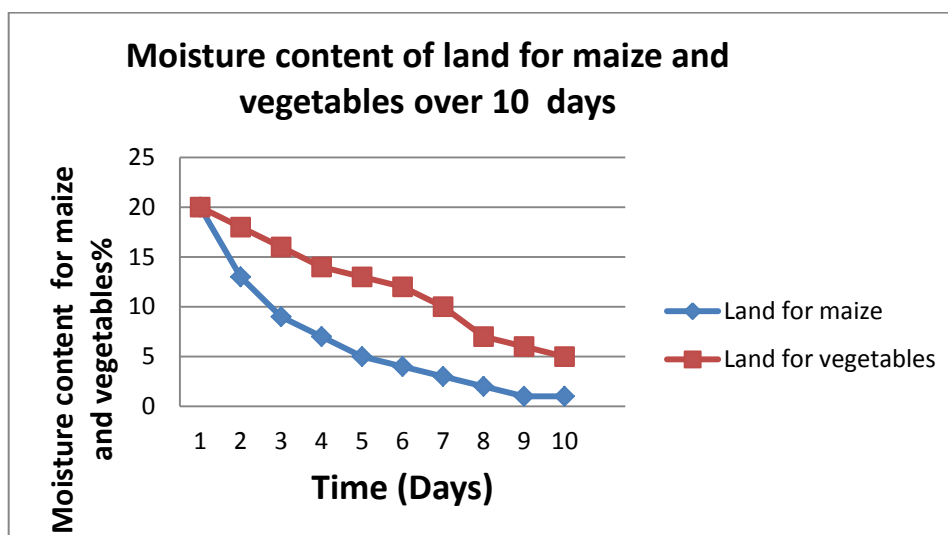
- 2.1 2.1.1 (a) B ✓ (1)  
 (b) C ✓ (1)  
 (c) A ✓ (1)  
 (d) D ✓ (1)
- 2.1.2 Its burning produces a greenhouse gas ✓ which contributes to global warming ✓ (2)
- 2.1.3 It produces fewer ✓ air pollutants than petrol or diesel ✓ (2)
- 2.1.4 B – Hydroxyl/OH ✓  
 C – Carboxyl/COOH ✓ (2)
- 2.2 2.2.1 Name – Sodium chloride ✓  
 Formula – NaCl ✓ (2)
- 2.2.2 Ionic bond ✓ (1)
- 2.2.3 • It was used as a preservative to stop bacteria in food ✓  
 • Used for the treatment of skins and hides ✓  
 • To enhance flavour ✓ (3)
- 2.3 2.3.1
- | Acid  | Base   |
|---|--|
| Donates H <sup>+</sup> ion when reacting with water ✓ | Accepts H <sup>+</sup> ion when dissolves in water ✓ |
| Taste sour ✓  | Taste bitter ✓                                       |
| High concentration of hydrogen ion ✓                  | High concentration of hydroxide ion (OH) ✓           |
| Turns litmus paper red ✓                              | Turns litmus paper blue ✓ (Any 2 x 2)                |
- (4)
- 2.3.2 Neutralisation ✓ (1)
- 2.3.3 • Water ✓  
 • Salt ✓ (2)
- 2.4 2.4.1 Amino acid ✓ (1)
- 2.4.2 (a) B ✓ (1)  
 (b) A ✓ (1)
- 2.4.3 Condensation ✓ (1)
- 2.4.4 • Needed for growth and repair worn out tissues ✓  
 • For the production of hormones and enzymes ✓  
 • They produce antibodies in animals ✓  
 • They are involved in the process of cell signalling ✓  
 • They transport other substances in the body ✓ (Any 3) (3)
- 2.5 2.5.1 Fructose ✓ (1)  
 2.5.2 Galactose ✓ (1)  
 2.5.3 Sucrose ✓ (1)  
 2.5.4 Lignin ✓ (1)  
 2.5.5 Cellulose ✓ (1)

**[35]**

**QUESTION 3: SOIL SCIENCE**

- 3.1 3.1.1 Farm B ✓ (1)
- 3.1.2
- Grey colour is a sign of water logging ✓
  - Texture is clayey with micro-pores which limit water movement ✓ (2)
- 3.1.3 Farm A ✓ (1)
- 3.1.4
- Increased soil depth ✓ to encourage a well-established root system ✓
  - Crumb structure ✓ ideal for soil cultivation ✓ (4)
- 3.1.5
- Favourable porosity and aeration ✓
  - No soil compaction/reduced soil crusting ✓
  - Improved root penetration ✓
  - Reduced soil erosion ✓
  - Improved emergence of seedlings ✓
  - Greater water infiltration, retention and availability ✓
  - Improved biological activity ✓ (Any 3) (3)
- 3.2 3.2.1 (a) Soil depth – pore space decreases with the increase in soil depth ✓ (1)
- (b) Soil cultivation – soil which is constantly cultivated have a lowered pore space ✓ (1)
- 3.2.2
- Soil texture ✓
  - Soil structure ✓ (2)
- 3.3 3.3.1 Dark/black ✓ (1)
- 3.3.2 Red ✓ (1)
- 3.3.3 Light ✓ (1)

3.4 3.4.1



Marking graph with the following checklist

Criteria	Yes : 1 mark	No : 0 mark
1. Line graph	1	0
2. Y-axis labelled (with units)	1	0
3. X-axis labelled	1	0
4. Points correctly plotted	1	0
5. Correct heading	1	0
6. Key	1	0

(6)

- 3.4.2
- Ground cover/mulch ✓
  - Wind breakers ✓
  - Minimum tillage ✓
  - Application of organic matter ✓

(Any 3) (3)

3.5 3.5.1 Radiation and reflection of sun's energy ✓

(1)

- 3.5.2 (a) Under moist and cloudy conditions, sun rays which are reflected up from the land ✓ will be reflected back down to the earth again ✓ (2)
- (b) Light coloured soils reflect much more light and heat ✓ and dark coloured soils absorb more light ✓ (2)

- 3.5.3
- Soil microbes are activated ✓
  - Seeds germinate faster ✓
  - Optimum plant growth and production ✓

(3)

**[35]****QUESTION 4: SOIL SCIENCE**

- 4.1 4.1.1
- The rock expands and contract leading to physical weathering. ✓
  - Small pieces of rocks formed C-horizon. ✓
  - Weathered rock undergo chemical weathering to form soil which become the medium for vegetation to grow. ✓
  - Through the process of littering, plants will drop leaves and twigs onto soil to form O-horizon. ✓
  - Micro-organisms convert organic debris on the soil through the process of humification. ✓
  - A-horizon is formed. ✓

(6)

4.1.2	Removal of particles due to leaching/low clay content/poor in organic matter ✓	(1)
4.1.3	<ul style="list-style-type: none"> <li>Accumulation of organic matter ✓</li> <li>Accumulation of clay ✓</li> <li>Accumulation of minerals ✓</li> </ul>	(3)
4.2 4.2.1	<ul style="list-style-type: none"> <li>Demarcate master horizons ✓</li> <li>Identify diagnostic horizons ✓</li> <li>Establish the soil form ✓</li> <li>Identify the series characteristics ✓</li> <li>Determine the soil series ✓</li> </ul>	(5)
4.2.2	<ul style="list-style-type: none"> <li>For optimal utilisation of a country's natural resources ✓</li> <li>For scientific planning of a farm ✓</li> <li>The development of new regions ✓</li> <li>For valuation of soil ✓</li> </ul>	(Any 2) (2)
4.3 4.3.1	(a) $K^+$ ✓ and $Na^+$ ✓ (b) $H^+$ ✓ and $Al^{+3}$ ✓ (c) $Ca^{+2}$ ✓ and $Mg^{+2}$ ✓	(2) (2) (2)
4.3.2	<ul style="list-style-type: none"> <li>Toxic quantities of aluminium stops the root growth ✓</li> <li>Phosphorus become fixated ✓</li> <li>Molybdenum become less available ✓</li> <li>Exchangeable calcium and magnesium ion is small ✓</li> </ul>	(Any 2) (2)
4.3.3	Add agricultural lime/ $CaCO_3$ ✓	(1)
4.4 4.4.1	1 Photosynthesis ✓ 3 Feeding ✓ 4 Respiration ✓ 5 Decomposition ✓ 6 Combustion ✓	(5)
4.4.2	Bacteria ✓ Fungi ✓	(2)
4.4.3	<ul style="list-style-type: none"> <li>Soil moisture ✓</li> <li>Mineral nutrients ✓</li> <li>Soil air ✓</li> <li>Optimum temperature ✓</li> <li>Optimum pH ✓</li> </ul>	(Any 2) (2)
		<b>[35]</b>

**TOTAL SECTION B: 105**  
**GRAND TOTAL: 150**