



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2014**

**AGRICULTURAL SCIENCES P1  
MEMORANDUM**

**MARKS: 150**

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This memorandum consists of 8 pages.

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

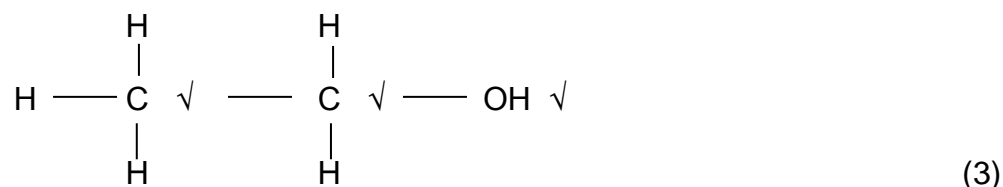
- 1.1 1.1.1 B ✓✓  
1.1.2 A ✓✓  
1.1.3 D ✓✓  
1.1.4 D ✓✓  
1.1.5 C ✓✓  
1.1.6 A ✓✓  
1.1.7 D ✓✓  
1.1.8 C ✓✓  
1.1.9 B ✓✓  
1.1.10 D ✓✓ (10 x 2) (20)
- 1.2 1.2.1 B ✓✓  
1.2.2 Both A and B ✓✓  
1.2.3 None ✓✓  
1.2.4 A ✓✓  
1.2.5 B ✓✓ (5 x 2) (10)
- 1.3 1.3.1 Periodic table ✓✓  
1.3.2 Reserve acidity ✓✓  
1.3.3 Inaccessible/unavailable ✓✓  
1.3.4 Nitrogen ✓✓  
1.3.5 Plasticity ✓✓ (5 x 2) (10)
- 1.4 1.4.1 Platy ✓  
1.4.2 cation exchange capacity ✓  
1.4.3 Solution ✓  
1.4.4 Halogen ✓  
1.4.5 Isotope ✓ (5 x 1) (5)

**TOTAL SECTION A: 45**

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

2.1 2.1.1 **Functional group of ethanol**  
Hydroxyl group ✓ (1)

2.1.2 **Structural formula of ethanol**



2.1.3 **Advantages of ethanol**

- (a) Environmentally – fewer greenhouse gases. ✓ (1)  
(b) Economically – it is produced with fewer costs. ✓ (1)

2.1.4 **Name and categorise carbohydrates**

Cellulose ✓ – polysaccharide ✓ (2)

2.2 2.2.1 **Identifying organic compounds**

A – Galactose ✓  
B – Fructose ✓ (2)

2.2.2 A – Aldo ring ✓  
B – Keto ring ✓ (2)

2.2.3 **Difference between glucose and galactose**

They differ because the position of OH on the 4<sup>th</sup> carbon atom is not the same. ✓✓ (2)

2.3 **Position of polysacchides**

2.3.1 Lignin – wood ✓ (1)

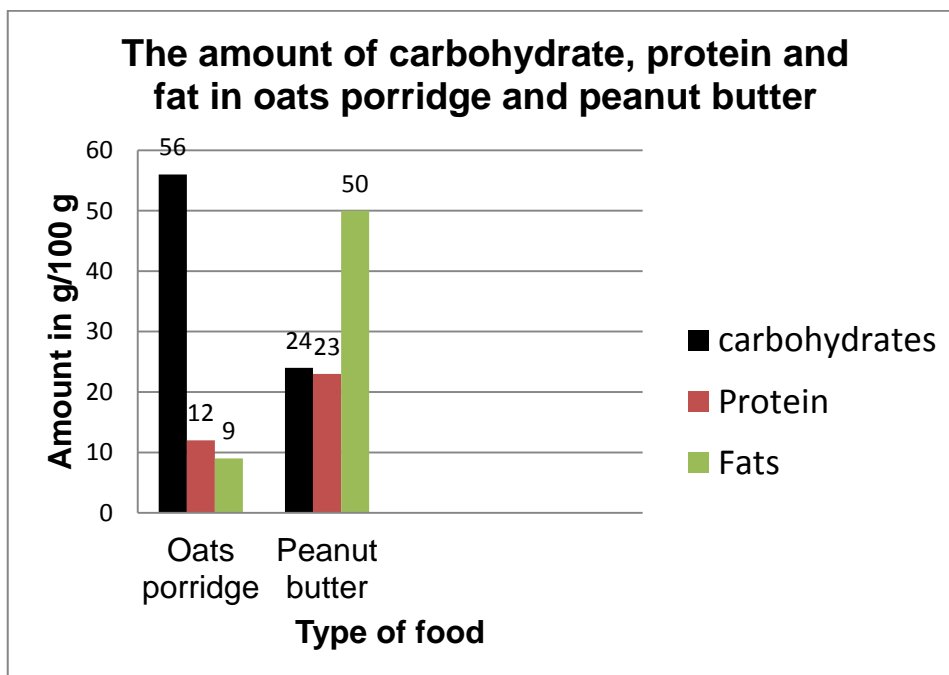
2.3.2 Starch – stored in the leaves, roots and stem of plants. ✓ (1)

2.3.3 Glycogen – liver and muscles of an animal. ✓ (1)

2.4 **THREE indigenous foods as a source of starch**

- Potatoes ✓
  - Rice ✓
  - Samp/maize ✓
  - Wheat ✓
  - Oats ✓
  - Sorghum ✓
  - Bread (barley) ✓
- (Any 3 x 1) (3)

2.5 2.5.1 **Bar graph to compare protein, fat and carbohydrate in oats porridge and peanut butter**



**Checklist for marking a graph**

Criteria		Mark
1.	Bar graph	1 ✓
2.	X-axis labelled	1 ✓
3.	Y-axis labelled	1 ✓
4.	Points correctly plotted	1 ✓
5.	Correct heading	1 ✓
6.	Key	1 ✓

(6)

2.5.2 **Food containing saturated fat**

Tuna fish ✓

(1)

2.5.3 **Reason**

It is of animal origin. ✓✓

(2)

2.6 2.6.1 **Identification of a chemical reaction**

Neutralisation ✓

(1)

2.6.2 The reaction takes place between the acid and a base. ✓

(1)

2.6.3 **TWO chemical bonds involved and examples**

Ionic bond ✓ example – HCL / KOH / KCl ✓

Covalent bond ✓ example – H<sub>2</sub>O ✓

(4)

**[35]**

**QUESTION 3: SOIL SCIENCE**

- 3.1 3.1.1 **Identification of a compacted soil**  
B ✓ (1)
- 3.1.2 **TWO visible signs of compaction**
  - Presence of micro pores ✓
  - Poor root development ✓(2)
- 3.1.3 **TWO ways to improve compaction**
  - Adding organic matter. ✓
  - Minimum tillage / less soil cultivation. ✓
  - Mulching / plant cover. ✓
  - Avoid tillage when soil is wet. ✓(Any 2 x 1) (2)
- 3.1.4 **THREE advantages of soil structure A**
  - Easy root penetration ✓
  - Increased water infiltration ✓
  - Better water holding capacity ✓
  - Reduced soil crusting ✓
  - Reduced soil erosion ✓(Any 3 x 1) (3)
- 3.2 3.2.1 **Texture classes**  
A – Loam ✓ (1)  
B – Clay ✓ (1)  
C – Sand ✓ (1)
- 3.2.2 **Characteristics of textures**  
(i) C ✓ (1)  
(ii) B ✓ (1)  
(iii) A ✓ (1)
- 3.3 **Indication of air and moisture in red and grey colour**
- 3.3.1 Enough air in red soil ✓ and absence of air in grey soil. ✓ (2)
- 3.3.2 Low moisture in red ✓ and high moisture in grey soil. ✓ (2)
- 3.4 3.4.1 **Forces that attract water molecules to soil particles**  
A – Adhesion forces ✓  
B – Cohesion forces ✓  
C – Gravitational forces ✓ (3)
- 3.4.2 **Reason for drainage of water at C**  
The distance between the water molecules and soil particles is high and ✓  
Earth gravity causes water to flow away as it is greater than cohesion force. ✓ (2)
- 3.5 **Soil water balance equation**  
Changes in soil water ✓ = inputs of water ✓ – losses of water ✓ (3)

3.6 3.6.1 **Calculation of bulk density**

$$\begin{aligned} \text{BD} &= \frac{\text{mass of dry soil g}}{\text{volume of dry soil cm}^3} \checkmark \\ &= \frac{580 \text{ g}}{250 \text{ cm}^3} \checkmark \\ &= 2,32 \text{ g/cm}^3 \checkmark \end{aligned} \quad (3)$$

- 3.6.2
- High bulk density  $\checkmark$
  - Not suitable for root crop  $\checkmark$
- (2)

3.7 3.7.1 **Influence of temperature on chemical processes**

The higher the temperature, the faster the chemical reactions.  $\checkmark$  This leads to the release of plant nutrients.  $\checkmark$

(2)

3.7.2 **TWO ways to manipulate soil temperature**

- Mulching  $\checkmark$
  - Clear plastic cover  $\checkmark$
  - Shading  $\checkmark$
  - Irrigation  $\checkmark$
  - Deep or shallow ploughing  $\checkmark$
- (Any 2 x 1) (2)

**[35]**

**QUESTION 4: SOIL SCIENCE**

**4.1 Characteristics of soil profiles**

- 4.1.1 C ✓ (1)
- 4.1.2 B ✓ (1)
- 4.1.3 D ✓ (1)
- 4.1.4 A ✓ (1)

**4.2 4.2.1 Identification of master horizons**

- A horizon ✓
- B horizon ✓ (2)

**4.2.2 TWO series characteristics**

- Dark soil colour ✓
- Blocky structure ✓ (2)

**4.2.3 TWO characteristics of vertic A**

- Strongly developed blocky structure ✓
- Sticky when wet ✓
- May have large cracks ✓
- High plastic index ✓
- May have slicken sides ✓
- Dark coloured ✓ (Any 2 x 1) (2)

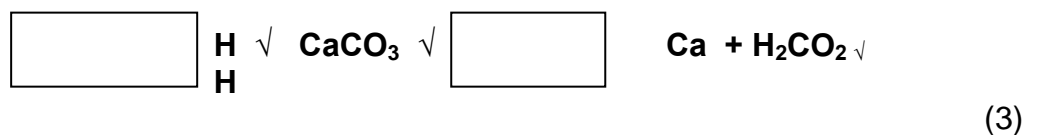
**4.3 4.3.1 Identification of a colloidal condition of the colloids**

- A – Acidic ✓
- B – Neutral ✓
- C – Alkaline ✓ (3)

**4.3.2 TWO factors influencing acidity**

- Application of nitrogen fertiliser ✓
- Acid rain ✓
- Oxidation of sulphates ✓
- Carbonic acids ✓ (Any 2 x 1) (2)

**4.3.3 Exchange reaction of reclamation process ✓**



#### 4.4 Comparison of saline and sodic soils

	Characteristics	Sodic soil	Saline soil	
4.4.1	Dominant salts	Na ✓	Ca and Mg ✓	(2)
4.4.2	Surface appearance	Black crust ✓	White crust ✓	(2)
4.4.3	Corrective measures	Apply gypsum ✓	Over irrigation ✓	(2)

#### 4.5 Fertility levels of vermiculite and kaolinite

4.5.1 Vermiculite – high fertility because of high negative charges ✓ which adsorb high amounts of cation. ✓ (2)

4.5.2 Kaolinite – Infertile because of low adsorption of cations ✓ and less negative charge. ✓ (2)

#### 4.6 4.6.1 **THREE practices causing the decline of organic matter**

- Soil texture ✓
- Tillage of soil ✓
- Type of vegetation ✓
- Use of artificial fertiliser ✓
- Cultivation of natural veld ✓
- Poor veld management and burning ✓ (Any 3 x 1) (3)

#### 4.6.2 **Influence of organic matter on biological properties**

It provides nutrients for micro-organisms ✓ which stimulates their growth. ✓ (2)

#### 4.6.3 **TWO ways that plants benefit from a mycorrhiza relationship**

- Plant roots absorb more phosphorus. ✓
- Helps roots to absorb zinc, copper and other nutrients. ✓
- Protects plants against diseases. ✓ (Any 2 x 1) (2)

**[35]**

**TOTAL SECTION B: 105**

**GRAND TOTAL: 150**