



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURAL SCIENCE P1

EXEMPLAR 2008

MEMORANDUM

MARKS: 150

TIME: 2 Hours

This marking guideline consists of 8 pages.

MARKING GUIDELINES**SECTION A / AFDELING A****Question 1.1 / Vraag 1.1**

1.1.1	A	B	X₁₁	D
1.1.2	A	X₁₁	C	D
1.1.3	A	X₁₁	C	D
1.1.4	A	B	C	X₁₁
1.1.5	A	X₁₁	C	D
1.1.6	A	X₁₁	C	D
1.1.7	X₁₁	B	C	D
1.1.8	A	B	X₁₁	D
1.1.9	A	B	X₁₁	D
1.1.10	A	B	C	X₁₁

10x2 (20)

Question 1.2 / Vraag 1.2

1.2.1	C₁₁
1.2.2	A₁₁
1.2.3	A₁₁
1.2.4	B₁₁
1.2.5	C₁₁

5x2 (10)

Question 1.3 / Vraag 1.31.3.1 nitrogen₁₁1.3.2 O-horizon₁₁1.3.3 budding₁₁1.3.4 cross pollination₁₁1.3.5 drainage₁₁

5x2 (10)

Question 1.4 / Vraag 1.4

1.4.1 hydrolysis ✓ (1)

1.4.2 red ✓ (1)

1.4.3 Cross-breeding ✓ (1)

1.4.4 Macro-element / macro nutrients ✓(1)

1.4.5 Precision ✓ (1)

5x1 (5)

SECTION B**QUESTION 2****2.1 Soil temperature**

- 2.1.1 Thermometer (1)
- 2.1.2 Control other external variables / control environmental conditions / same conditions (1)
- 2.1.3 Keep the physical variables in the soil the same / similar soil conditions (1)
- 2.1.4 Dark coloured soils absorb more / radiation and are warmer / **or** light coloured reflect more radiation / and are cooler / (2)
- 2.1.5 Pot 3: 18 °C
Pot 4: 12 °C (2)
- 2.1.6 Soil closer to the surface receive more heat and is warmer than deeper soil (1)
[8]

2.2 Soil horizons

- 2.2.1 A / B (1)
- 2.2.2 Soil profile **2** /
Deeper soil / well developed soil / ideal soil profile / (2)
- 2.2.3 C horizon (1)
- 2.2.4 Soil profile **4** (1)
[5]

2.3 Fertilizers

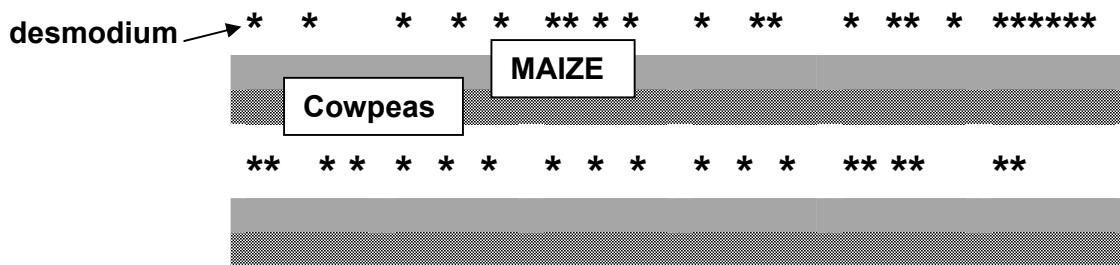
- 2.3.1 A and C / Bone meal and Quano (2)
- 2.3.2 Dissolve easily in water
Immediately available to plants
Accurately measure the nutrients added to the soil (any 2) (2)
- 2.3.3 Broadcasting (1)
- 2.3.4 Expensive to transport
because it is very bulky and large quantities need to be applied (2)
[7]

2.4 **Pollination**

- 2.4.1 D / Ovary (1)
- 2.4.2 Self-pollination (1)
- 2.4.3 Stamens bend downwards and is very close to the stigma (2)
- 2.4.4 Petals have bright colours
Insect (bee) attracted by characteristic smell
Nectar serves as food
When the insect sit down on the flower the stamens bend downwards (any 3) (3)
[7]

2.5 **Intercropping**

- 2.5.1 The ploughing of two or more crops on the same field at the same time in an alternating manner or one crop in-between another. (2)
- 2.5.2 Intercropping can be schematically illustrated as shown below:



1 mark for each crop used – three crops used in a similar way as above: (3 marks) and (plant maize rows alternate them with cowpeas and in-between the maize plant desmodium plants);
(Any 3 and)

Any 3 reasons (see below) for using the indicated crops (any 3)

- Both cowpeas and desmodium will supply the soil with nitrogen;
- Desmodium plants will assist with the prevention of striga weeds from growing in between the maize plants;
- It also acts as a good cover crop, preventing soil erosion;
- Desmodium crop keeps the adult moth from laying their eggs on the maize plants by secreting a chemical that the stem borer does not like. (6)
[8]

[35]

QUESTION 3**3.1 Soil water and soil texture**

- 3.1.1 Clay (1)
- 3.1.2 120 mm (1)
- 3.1.3 25 mm (1)
- 3.1.4 Soils with a light texture (/like sandy soils) have a lower field capacity ✓
than soils with a heavy texture (/like clay soils) which have a higher field capacity✓ (2)
- 3.1.5 A clay-loam soil has a higher wilting point and field capacity and need to be kept wetter / need more irrigation than a sandy-loam soil which has a lower wilting point and field capacity and will need less water (less irrigation) **or** over irrigation on a sandy-loam soil might cause excessive leaching over irrigation on a clay-loam soil will not cause excessive leaching (Any 4) (4)
- 3.1.6 Field capacity **and** Water is easily accessible to plants / Micro-pores are filled with water / 25% of soil contains water / water is held with less energy (Any 3) (3)
- 3.1.7 Field method to determine the soil texture class (1)
[13]

3.2 Transpiration

- 3.2.1 16:00 (1)
- 3.2.2 Between 12:00 and 14:00 there was a drop in the rate of transpiration✓ and then an increase until 16:00 in graph B✓ in graph A the rate of transpiration increased with no drop in the rate until 16:00✓ (2)
Reason: An environmental factor like a drop in the wind speed✓ / cloud cover✓ / sudden drop in temperature✓ / irrigation application✓ could have caused the transpiration rate to decrease for a period of time. (Any 3) (1)
- 3.2.3 Graph **B**
The rate of transpiration was not gradual / fluctuation caused by environmental conditions (2)

- 3.2.4 **Stomata**
These are the structures that open to create opening for transpiration to occur / less of the water vapour through the leaves occur mainly through the stomata (2)
[8]
- 3.3 **Weed control**
- 3.3.1 A- Crop production decrease , because of competition for water between the crops and weed.(higher rainfall)
B- There is not enough water for weed and the crops , that is why the yield of curve B is lower than curve A.(lower rainfall) (4)
- 3.3.2 More weeds in the field cause the yield will drop (2)
- 3.3.3 Competition for space , nutrients and water
Weed grow faster and more seed (2)
[8]
- 3.4 **Tillage practices**
- 3.4.1
 - Diagram A-conventional tillage practice
 - Diagram B- zero tillage practice(2)
- 3.4.2 **Interpretation**
 - Conventional tillage practice leads to lower soil moisture and more soil loss than zero tillage,
 - Therefore zero tillage is beneficial to the soil because the crop residue left on the soil acts as a mulch keeping water in the soil and
 - Reducing the effect of the rate of evaporation(3)
- 3.4.3 Conventional tillage (1)
[6]
[35]

QUESTION 4

4.1 Soil texture and soil pore spaces

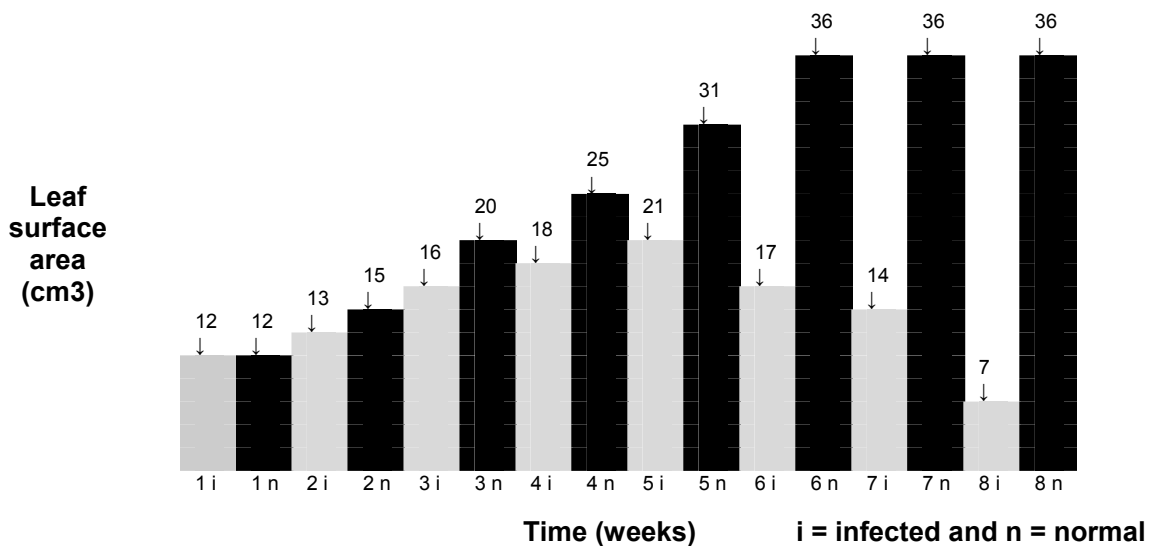
- 4.1.1 0,05 mm – 2 mm (1)
- 4.1.2 sand has a large quantity of micro-pores, silt has a lower and clay has the lowest quantity of macro-pores (2)
- 4.1.3 clay soil (1)
- 4.1.4 the larger the pore sizes / the more macro-pore in the soil (sandy soil)
the higher will the rate of percolation be **or**
the smaller the pore sizes / the more micro-pore in the soil (clay soil)
the lower will the rate of percolation be (2)
[6]

4.2 Chemical reaction in the soil

- 4.2.1 Acidifying of soil (1)
- 4.2.2 Soil texture / more sandy soil / lighter textured soil (1)
- 4.2.3 pH value will increase (1)
[3]

4.3 Plant disease

4.3.1 Graph:



CRITERIA	INDICATORS		
Use of space	Not in proportion, incorrect size and wrong scale. 0	In perfect proportion or correct size or correct scale 1	In perfect proportion and correct size and correct scale 2
Correctness	Not a bar graph, incorrect values and no headings 0	Bar graph or correct headings. 1	Bar graph and correct values and correct headings. 2
Neatness	No neat bars and did not use a ruler for lines and no measured distances 0	Neatly drawn bars or used a ruler for lines or measured distances. 1	Neatly drawn bars and used a ruler for lines and measured distances. 2
TOTAL			(6)

4.3.2 Leaf has reach its mature size / maturity (1)
[7]

4.4 Correct use of resources

4.4.1 Pasture / fodder production (1)

4.4.2 Conditions in the soil

(a) Very slow / little erosion of rock material
Parent material very resistant to erosion
Sparse vegetation leading to more soil erosion
Less roots to bind the soil
It is still a young soil (Any 2) (2)

(b) Sparse or little vegetation to add organic material to the soil
High temperatures lead to more decomposition
Shallow soil is unfavourable for vegetation
It holds less water and nutrients for plant growth (Any 2) (2)

4.4.3 Primary minerals (quarts) / hard minerals in the parent material which is very resistant to erosion processes (1)

4.4.4 Soil protection Act / example of a Act of this nature (1)
[7]

4.5 Irrigation systems

4.5.1 A: increase in leaf diseases
Reason: wet leaves from sprinkler water on leaf areas during irrigation created more risk for diseases on leaf areas
B: minimum effect
Reason: part of the plant are not wet when irrigated which creates less risk for plant diseases
C: Increase in root diseases
Reason: root areas are saturated for a period of time after irrigation increasing the risk of root diseases (6)

4.5.2 Micro irrigation / B (1)
[7]

4.6 **Natural resources**

- Diving the veld into several camps according to their palatability
- The number and size of the camps will be determined by veld management system
- Each camp must have more or less the same carrying capacity
- Providing easy to reach watering places, the number will depend on size and number of livestock
- practicing rotational grazing system
- Destroyed veld must be fenced off to allow it to rest
- Natural shelter and shade must be included where possible
- Keeping/farming with the correct types of animal
- Fodder crop cultivations must be fenced separately, to be used during times of drought

(5)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150