



## **education**

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### **PROVINCIAL ASSESSMENT**

**GRADE 10**

**AGRICULTURAL SCIENCES P2**

**NOVEMBER 2019**

**MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist of 10 pages.**

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

1.1	1.1.1	C ✓✓	(10 x 2)	(20)
	1.1.2	B ✓✓		
	1.1.3	D ✓✓		
	1.1.4	A ✓✓		
	1.1.5	D ✓✓		
	1.1.6	C ✓✓		
	1.1.7	A ✓✓		
	1.1.8	B ✓✓		
	1.1.9	D ✓✓		
	1.1.10	C ✓✓		
1.2	1.2.1	D ✓✓	(5 x 2)	(10)
	1.2.2	F ✓✓		
	1.2.3	H ✓✓		
	1.2.4	A ✓✓		
	1.2.5	B ✓✓		
1.3	1.3.1	Prophase ✓✓	(5 x 2)	(10)
	1.3.2	Dolomite ✓✓		
	1.3.3	Cell ✓✓		
	1.3.4	Cereal ✓✓		
	1.3.5	Salinity ✓✓		
1.4	1.4.1	Lustre ✓	(5 x 1)	(5)
	1.4.2	Climate/rainfall/temperature ✓		
	1.4.3	Dams ✓		
	1.4.4	Chloroplasts ✓		
	1.4.5	Pollution ✓		
<b>TOTAL SECTION A:</b>			<b>45</b>	

**SECTION B****QUESTION 2: OPTIMAL RESOURCE UTILIZATION****2.1 Solar power****2.1.1 Definition of the concept solar power**

- Energy from the sun's rays/sun ✓
  - Converted into electricity/electrical energy ✓
- (2)

**2.1.2 Explanation whether solar power is a renewable or non-renewable resource**

A renewable resource ✓

**REASON**

- It can be easily replenished
  - It is unable to be used up because it exists in abundance
  - It is inexhaustible because it replenishes itself naturally ✓
- (Any 2) (2)

**2.1.3 TWO reasons why homeowners install solar power systems**

- To reduce their reliance on Eskom ✓
  - To lower their electricity bills ✓
  - To make their homes environmentally friendly ✓
- (Any 2) (2)

**2.1.4 The benefit of the battery storage system to homeowners**

It provides back-up power in the event of load shedding or power failures ✓ (1)

**2.2 Water pollution****2.2.1 THREE agricultural practices that contribute to water pollution**

- Pesticide crop dusting ✓
  - Fertilizer run-off ✓
  - Livestock waste ✓
- (3)

**2.2.2 TWO measures that could be applied to control water pollution by sediments**

- Put compost or weed-free mulch on soils to prevent soil from being washed away ✓
  - Avoid ploughing fields next to rivers when they are too dry or too wet ✓
- (2)

**2.2.3 Definition of the concept water quality**

- It is the chemical, physical and biological ✓
  - characteristics of water ✓
- (2)

**2.2.4 The role of rain in river pollution**

- Rain collects pollutants such as residues ✓
  - from pesticides/fertilizers and wash them into the river leading to pollution ✓
- (2)

**2.3 Consumption of beef and poultry meat per person in South Africa between 2014 and 2018**

**2.3.1 Calculation of the average consumption of beef per person between 2014 and 2018**

- 20kg + 15kg + 15kg + 25kg + 20kg ✓
- = 95kg ÷ 5 ✓
- = 19kg ✓

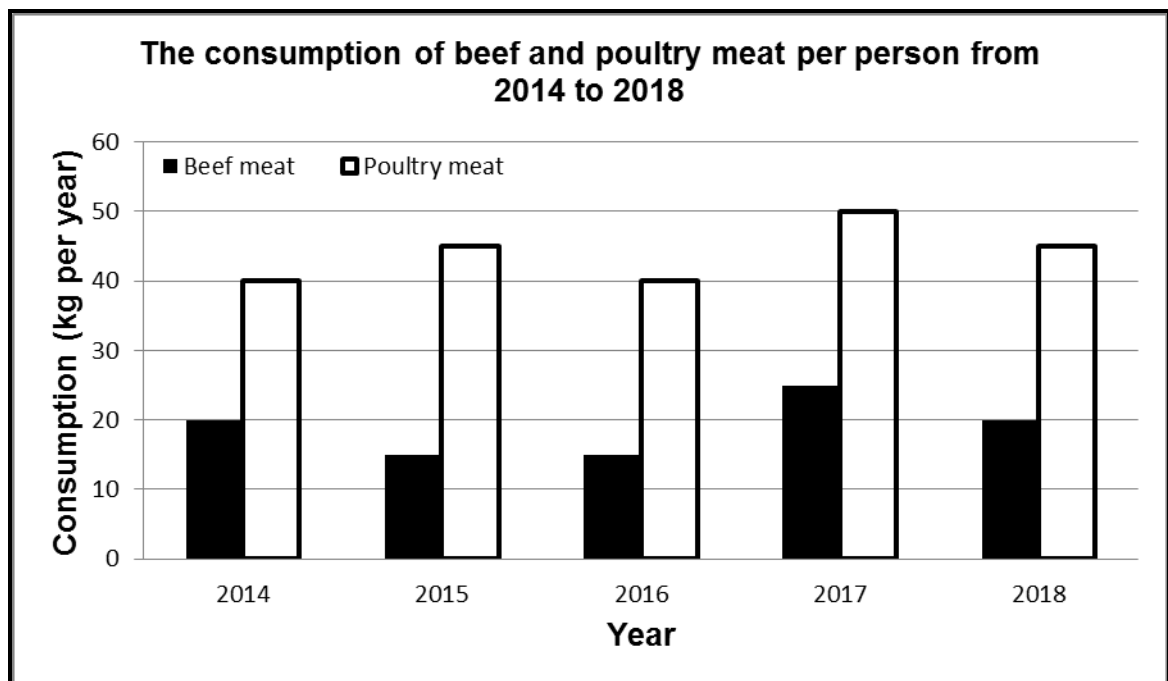
(3)

**2.3.2 A reason why more poultry meat is consumed in South Africa**

Poultry meat is cheaper than beef/poorer households can only afford cheap poultry meat ✓

(1)

**2.3.3 A combined bar graph of the consumption of beef and poultry meat per person in South Africa between 2014 and 2018**



**Criteria/rubric for marking the graph**

- Correct heading (Consumption of beef and poultry meat per person between 2014 and 2018) ✓
- X-axis: Correct calibrations and labelled (Years) ✓
- Y-axis: Correct calibrations and labelled (Consumption) ✓
- Correct unit on the Y-axis (Kg per year) ✓
- Combined bar graph ✓
- Accuracy ✓

(6)

**2.4 The diagram on soil density**

**2.4.1 Explanation of the concept compacted soil**

- The condition wherein the soil particles are squashed together ✓
- leaving little space for air and water ✓

(2)

- 2.4.2 **TWO advantages of loose soil particles in plant growth**
- Have more spaces for air that help plant roots to breath better ✓
  - Plant roots are able to access and absorb more water ✓
  - Loose soil particles promote the growth of soil microbes ✓
  - Plant roots are able to penetrate deeper into the layers and fix plants more firmly ✓
- (Any 2) (2)
- 2.4.3 **TWO causes of soil compaction**
- The use of heavy machinery on the soil ✓
  - Wrong cultivation methods ✓
  - Cultivation when the soil is too wet ✓
  - Too many cultivations ✓
- (Any 2) (2)
- 2.4.4 **THREE measures to reduce soil compaction**
- Avoid cultivating soils that are too wet ✓
  - Use wider tyres for vehicles/equipment working on soils ✓
  - Avoid using heavy machinery on soils ✓
  - Scientific cultivation methods/no till/minimum till use ✓
- (3)  
[35]

### QUESTION 3: SOIL SCIENCES

- 3.1 **The diagram on the soil components**
- 3.1.1 **A reason for the mineral particles being the largest part of the soil**  
Soils are formed from these mineral particles during weathering ✓
- (1)
- 3.1.2 **TWO major mineral types from which the mineral particles are formed**
- Primary minerals ✓
  - Secondary minerals ✓
- (2)
- 3.1.3 **Difference between Capillary water**
- Found around soil pores of soil particles ✓
  - and can be absorbed by plant roots ✓
- (2)
- Hygroscopic water**
- Held very tightly by the soil particles ✓
  - and cannot be absorbed by plant roots ✓
- (2)
- 3.1.4 **Examples of soil living organisms**
- (a) Macro-organisms**
- Earthworms ✓
  - Ants ✓
  - Termites ✓
  - Millipedes ✓
- (Any 1) (1)

**(b) Micro-organisms**

- Bacteria ✓
  - Fungi ✓
- (Any 1) (1)

**3.2 The rock cycle****3.2.1 Identification of the rock types**

- A** – Igneous rock ✓
- B** – Metamorphic rock ✓
- (2)

**3.2.2 How sedimentary rocks are formed**

- When sediments ✓
  - settle under forces of gravity and become hard ✓
- (2)

**3.2.3 THREE examples of sedimentary rocks**

- Sandstone ✓
  - Shale ✓
  - Limestone ✓
  - Dolomite ✓
  - Phosphorites ✓
  - Gypsum ✓
  - Rock salt ✓
  - Coal ✓
  - Conglomerate ✓
- (Any 3) (3)

**3.2.4 Explanation of the concept magma**

- Hot fluid material from beneath the earth ✓
  - forms lava and other igneous rocks after cooling ✓
- (2)

**3.3 Characteristics of weathering****3.3.1 THREE characteristics which apply to chemical weathering**

- Silicate reacts with water to form a new mineral ✓
  - Plates of clay absorb water, making it softer and easier to weather ✓
  - Water reacts with carbon dioxide to form carbonic acid which weathers rocks ✓
  - Rocks are broken down by continued exposure to oxygen ✓
- (Any 3) (3)

**3.3.2 TWO agents that apply to physical/mechanical weathering**

- Temperature ✓
  - Wind ✓
  - Water ✓
  - Glaciers ✓
- (Any 2) (2)

**3.3.3 Distinguishing between****Weathering**

- The breaking down of rocks ✓
  - brought about by biological, chemical and physical agents ✓
- (2)

**Erosion**

- The removal of soil/dissolved material ✓
- from one location to another by agents such as water/wind ✓ (2)

### 3.4 The factors involved in soil formation

#### 3.4.1 The role of the climatic factors in soil formation

##### (a) Rainfall

- The amount of rainfall determines ✓
- the rate of chemical/biological weathering and leaching ✓ (2)

##### (b) Temperature

- Rocks in warm areas weather much faster ✓
- than similar rocks in cold regions ✓ (2)

#### 3.4.2 The major type of weathering of rocks that is influenced by topography

- Physical/mechanical weathering ✓ (1)

#### 3.4.3 The soil forming factor that determines colour, chemical properties and mineral content of soil

- Parent material/rock ✓ (1)

#### 3.4.4 TWO importance of soil in ecosystems

- Soil is the growth medium for plants ✓
- Soil supplies water, nutrients and air to plants ✓
- It provides habitat for soil organisms ✓
- Soil help in regulating plant temperature ✓ (Any 2) (2)

**[35]**

**QUESTION 4: PLANT STUDIES AND BIOLOGICAL CONCEPTS****4.1 The map of South Africa showing the main production areas of specific agricultural commodities****Matching the products with the areas indicated on the map**

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

**4.2 Exotic species****4.2.1 Definition of the concept exotic species**

- Species growing in an area ✓
- different to their natural habitat ✓
- where they do not naturally occur ✓
- species that originally came from other countries ✓
- and are able to survive/reproduce in another country ✓ (Any 2) (2)

**4.2.2 TWO reasons why exotic forest species are preferred to native species**

- Exotic species have growing rates much greater than native species ✓
- Produce more wood per unit of area in less time ✓ (2)

**4.2.3 The TWO main groups into which exotic forests are classified and ONE example of each**

(a) Hardwood ✓ (1)

**Example:**

- Eucalyptus/Gumtree ✓
- Leadwood ✓
- Mopane tree ✓
- Wattle tree ✓ (Any 1) (1)

(b) Soft wood ✓ (1)

**Example:**

- Pine tree ✓ (1)



### 4.3 Lucerne

#### 4.3.1 Agricultural value of lucerne

Lucerne is planted as a pasture/fodder crop ✓ (1)

#### 4.3.2 The production of lucerne in terms of:

##### (a) Type of soil

- Survives from sandy loam to clay soils ✓
- Can survive in acidic soils with a light application of lime ✓
- It does well on well-drained loam soils ✓ (Any 2) (2)

##### (b) Climate

- Grows well under warm and dry conditions ✓
- It prefers sunny conditions ✓
- It can tolerate wide climatic variations ✓ (Any 2) (2)

### 4.4 Phases of the first meiotic division

#### 4.4.1 Matching the phases of the first meiotic division.

A Prophase 1 ✓ (1)

B Anaphase 1 ✓ (1)

C Telophase 1 ✓ (1)

D Metaphase 1 ✓ (1)

#### 4.4.2 Definition of the term meiosis

- The type of cell division that results in four daughter cells ✓
- each with half the number of chromosomes of the parent cell ✓ (2)

#### 4.4.3 TWO importance of meiosis in living organisms

- Meiosis assists in the formation of sex cells/gametes ✓
- Halves the number of chromosomes in daughter cells ✓
- Ensures a constant number of chromosomes in body cells from one generation to the next ✓
- Brings genetic variation in organisms ✓ (Any 2) (2)

**4.5 The diagram on a specific cell****4.5.1 The name of the cell above**

Animal cell ✓

(1)

**4.5.2 The names of the part that corresponds with the functions:**

A Centriole ✓

(1)

B Lysosome ✓

(1)

C Nuclear membrane ✓

(1)

D Cytoplasm ✓

(1)

**4.5.3 FOUR similarities between animal and plant cells**

- Cell membrane is present in both animal and plant cells ✓
- Both have nucleus ✓
- Mitochondria exists in both cells ✓
- Both have ribosomes ✓
- Endoplasmic reticulum is found in both cells ✓
- Golgi apparatus are present in both cells ✓
- Both have vacuoles ✓

(Any 4)

(4)  
**[35]****TOTAL SECTION B: 105**  
**GRAND TOTAL: 150**