education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 11

AGRICULTURAL SCIENCES P2

NOVEMBER 2024

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 10 pages.

SECTION A

QUESTION 1

1.1	1.1.1	B ✓✓		
	1.1.2	A ✓✓		
	1.1.3	C ✓✓		
	1.1.4	D ✓✓		
	1.1.5	D ✓✓		
	1.1.6	B ✓✓		
	1.1.7	C ✓✓		
	1.1.8	A ✓✓		
	1.1.9	B ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	E ✓✓		
	1.2.2	A ✓✓		
	1.2.3	H ✓✓		
	1.2.4	J ✓✓		
	1.2.5	B ✓✓	(5 x 2)	(10)
1.3	1.3.1	Phloem ✓✓		
	1.3.2	Parthenocarpy ✓✓		
	1.3.3	Drainage ✓✓		
	1.3.4	Monoculture ✓✓		
	1.3.5	Greenhouse ✓✓	(5 x 2)	(10)
1.4	1.4.1	Organic fertiliser ✓		
	1.4.2	Selection ✓		
	1.4.3	Crop rotation ✓		
	1.4.4	Irrigation ✓		
	1.4.5	Tensiometer ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: PLANT NUTRITION

2.1 Water and Nutrients

2.1.1 **Identify the process**
Transpiration ✓ (1)

2.1.2 **TWO adaptations of plants to reduce water loss**
- In broad-leaved plants most of the stomata are on the underside of the leaves ✓
- The stomata are surrounded by two guard cells ✓
- Shiny leaves to reflect heat waves ✓
- Layer of plant hairs on the leaves ✓
- Surface of leaves covered by a waxy layer ✓
- Plants adapt their growth season ✓
- Plants roll up their leaves ✓
- Plants have small leaves ✓
- Plants have light grey leaf covering ✓
- Plants only produce leaves in the rainy season ✓
- Succulents store water in their stems and leaves become needles ✓
- Stomata are sunken ✓
- Thickened leaves (succulents) ✓ (Any 2) (2)

2.1.3 **TWO reasons why the process is essential for plant growth**
- Assists with the absorption of water ✓
- Assists with the absorption of mineral salts ✓
- Helps balance the water content in the plant ✓ (Any 2) (2)

2.2 Mineral nutrition

2.2.1 **Recommend the fertiliser bag for better yield of leaf crops** (1)
Bag **A** ✓

2.2.2 **Justify with TWO reasons**
- The proportion/percentage of nitrogen in Bag **A** (8) is greater than the proportion of nitrogen in Bag **B** (1). ✓
- Leafy vegetables require more nitrogen for vegetative growth. ✓ (2)

2.2.3 **Purpose of the number (30)**
The figure **30** indicates the percentage mass of the fertiliser ✓ that contains the elements. ✓

OR

30 indicates the total amount of nutrients ✓ in 100 kg of the mixture. ✓

OR

30 indicates that the fertiliser contains a 30% mixture ✓ of N.P.K. ✓ (2)

2.3 Nutrients - Storage organs

2.3.1 THREE parts of a plant modified as a storage organ

- Stems ✓
- Roots ✓
- Leaves ✓
- Seeds ✓
- Fruit ✓

(Any 3) (3)

2.3.2 ONE chemical process

Photosynthesis ✓ (1)

2.3.3 TWO requirements for photosynthesis

- CO_2 ✓
- Sunlight ✓
- Water ✓

(Any 2) (2)

2.3.4 ONE product that is stored in plants

- Starch ✓
- Sugar / Glucose ✓
- Lipids/fats ✓
- Proteins ✓

(Any 1) (1)

2.4 Plant minerals

2.4.1 Supply labels

A – Phosphorus ✓
B – Potassium ✓
C – Micro ✓
D – Leaf chlorosis ✓ (4)

2.4.2 TWO methods to determine nutrient status

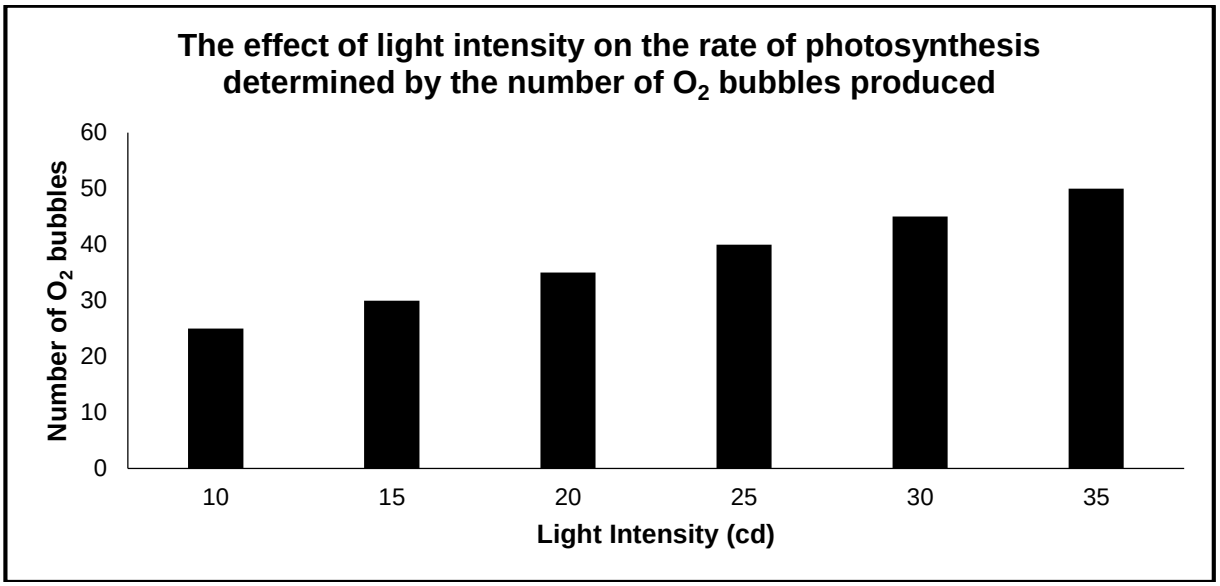
- Soil analysis ✓
- Plant/leaf analysis ✓ (2)

2.4.3 TWO factors that influence availability

- Soil texture ✓
- Soil pH ✓ (2)

2.5 Rate of photosynthesis

2.5.1 Graph to determine the effect of light intensity on the rate of photosynthesis



CRITERIA/RUBRIC/MARKING GUIDELINES

- Correct heading (C) ✓
- Bar graph (T) ✓
- Correct units (cd) (U) ✓
- X-axis: Correctly calibrated and labelled (Light Intensity) (X) ✓
- Y-axis: Correctly calibrated and labelled (Number of O_2 bubbles) (Y) ✓
- Accuracy (80% + correct plotting) (P) ✓ (6)

2.5.2 Trend of how number of bubbles is affected by light intensity

As the light intensity increases ✓ the number of O_2 bubbles also increase ✓ (2)

2.5.3 TWO methods to manipulate plants as to increase rate of photosynthesis

- Trellising ✓
- Pruning ✓
- Spacing ✓
- Greenhouses ✓ (Any 2) (2)

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QUESTION 3: PLANT REPRODUCTION

3.1 Sexual reproduction

3.1.1 **Letter of the Male organ of a flower**
C ✓ (1)

3.1.2 **Letter of the Modified floral leaves which form the pistil**
A ✓ (1)

3.1.3 **Letter of the part of the pistil that produces egg cells**
B ✓ (1)

3.1.4 **Letter of the tube connecting the stigma to the ovary**
D ✓ (1)

3.1.5 **Dicotyledonous flowers**
Flowers that produce seed (embryos) ✓ with two cotyledons (seed lobes) ✓ (2)

3.2 Seed germination

3.2.1 **Provide the LETTER and NAME**
a) C ✓ Stigma ✓
b) A ✓ Pistal ✓
c) B ✓ Ovary ✓ (6)

3.2.2 **Cell division that forms male gametes**
Mitosis ✓ (1)

3.3 Types of seed germination

3.3.1 **Identify the types of seed germination**
A – Dicotyledonous ✓
B – Monocotyledonous ✓ (2)

3.3.2 **THREE environmental conditions for seed germination**
- Sufficient water ✓
- Sufficient oxygen ✓
- Sufficient warmth ✓
- Sufficient light ✓ (Any 3) (3)

3.3.3 **TWO scarification methods**
- Mechanical ✓
- Thermal ✓
- Chemical ✓
- Animals ✓ (Any 2) (2)

3.4 Plant improvement

3.4.1 ONE advantage and ONE disadvantage

Advantage – desired traits develop ✓
Disadvantage – offspring can be sterile ✓ (2)

3.4.2 THREE desired traits

- Insect or disease resistant ✓
- Herbicide resistant ✓
- Drought resistant ✓
- Higher nutritional value ✓
- Crop yield increases ✓
- GM crops stay fresh for longer ✓
- Safe for human consumption ✓
- New improved varieties ✓ (Any 3) (3)

3.4.3 The aim of mutation

- Improve crop quality ✓
- Improve genetic variation and heredity ✓ (2)

3.5 Plant pests/ parasites and diseases

3.5.1 ONE way in which weeds reduce yields

- Smother plants ✓
- Slow the growth of plants ✓
- Hosts for pests ✓
- Use more water ✓
- Affect soil structure ✓
- Use nutrients that plants could have used ✓ (Any 1) (1)

3.5.2 TWO reasons why weeds grow more easily than crops

- Grow easily in disturbed/damaged environments ✓
- Produce large quantities of seeds ✓
- Seeds last very long ✓
- Generates many times in single growing season ✓
- Thrive in extreme environmental conditions ✓
- No biological enemies ✓ (Any 2) (2)

3.5.3 TWO weed dispersal agents

- Birds ✓
- Humans ✓
- Animals ✓
- Wind ✓
- Seeds and plants ✓
- Vegetatively ✓
- Crops after harvesting ✓ (Any 2) (2)

3.6 **THREE measures to prevent/control the spread of plant disease**

- Cultural control ✓
- Biological control ✓
- Chemical control ✓

(3)
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QUESTION 4: OPTIMAL RESOURCE UTILISATION

4.1 **Soil surveying**

Re-arrange the steps in chronological order

- Aerial photographs of the region are taken and studied ✓
- Once the aerial photograph has been taken, the survey area is visited ✓
- The farm or area is divided up into homogenous land and /or veld types ✓
- A soil classification of clearly indicated profile test holes is used ✓
- The soil horizons of the test holes are now described ✓
- All the information gathered is interpreted to determine the suitability of the soil ✓ (6)

4.2 **Precision farming**

4.2.1 **THREE ultra-modern technologies**

- NICT ✓
- Geo-location data (GPS) ✓
- Characterising variability ✓
- New information and communication technology ✓ (Any 3) (3)

4.2.2 **TWO economic benefits**

- Reduces the need for nutrient/fertiliser input ✓
- Higher production output ✓ (2)

4.3 **Soil cultivation**

4.3.1 **THREE aims/effects of Primary soil cultivation**

- Aeration ✓
- Soil moisture ✓
- Infiltration ✓
- Temperature ✓
- Break the soil and dig up the land ✓
- Nutrient status ✓ (Any 3) (3)

4.3.2 **Differentiate between *primary* and *secondary* soil cultivation**

Primary soil cultivation

It is the first tillage or cultivation ✓ of the soil in the new season before planting ✓ (2)

Secondary soil cultivation

Is to improve the seed bed ✓ by making the soil finer through working crop residue into the soil and removing weeds ✓ (2)

4.4 **Irrigation systems**

4.4.1 **Identify the irrigation systems**

A – Flood irrigation ✓
B – Pivot/Sprinkler irrigation ✓
C – Micro-irrigation ✓ (3)

4.4.2 **TWO conditions for flood irrigation**

- Level slope ✓
- Water that is cheap and plentiful ✓
- Strong stream of water ✓ (2)

4.4.3 **ONE advantage of pivot/sprinkler irrigation**

- Less labour ✓
- No water loss through seepage ✓
- Water is measured accurately ✓
- Use of uneven ground is possible ✓
- Water applied uniformly ✓ (Any 1) (1)

4.4.4 **TWO criteria that determine water quality**

- No toxins ✓
- No pathogenic organisms ✓
- No high biological content ✓
- No high salt content ✓ (Any 2) (2)

4.5 **Calculate the total moisture content of the loam soil as a percentage. Show formula and ALL calculations.**

$$\% \text{ moisture} = \frac{\text{moisture mass – dry mass}}{\text{dry mass}} \times 100 \checkmark$$

$$= \frac{150\text{g} - 120\text{g}}{120\text{g}} \times 100 \checkmark$$

$$= 25 \checkmark \% \checkmark$$ (4)

4.6 Aquaculture

4.6.1 Identify the type of farming

Aquaculture ✓ (1)

4.6.2 TWO basic requirements for higher yield

- Temperature ✓
- Water quality ✓
- Dissolved oxygen ✓
- Feed management ✓
- pH ✓
- Maintenance ✓
- Nitrogenous compounds ✓
- Disease control ✓ (Any 2) (2)

4.6.3 TWO factors that farmers must consider when choosing a fish species.

- Stock may not be collected from the wild ✓
- Knowledge of the species ✓
- Adaptibility in high densities ✓
- Species that have the ability to produce hybrid species with indigenous species may not be used ✓
- Disease and parasitic status of a species ✓
- Market price and demand ✓
- Simple larval development ✓
- Reproduction in detention ✓ (Any 2) (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150