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GRADE 11

NOVEMBER 2020

**AGRICULTURAL SCIENCES P2
MARKING GUIDELINE
(EXEMPLAR)**

MARKS: 150

This marking guideline consists of 9 pages.

SECTION A**QUESTION 1**

1.1	1.1.1	A ✓✓		
	1.1.2	C ✓✓		
	1.1.3	B ✓✓		
	1.1.4	C ✓✓		
	1.1.5	B ✓✓		
	1.1.6	C ✓✓		
	1.1.7	C ✓✓		
	1.1.8	A ✓✓		
	1.1.9	D ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	H ✓✓		
	1.2.2	E ✓✓		
	1.2.3	F ✓✓		
	1.2.4	B ✓✓		
	1.2.5	A ✓✓	(5 x 2)	(10)
1.3	1.3.1	Transpirational pull ✓✓		
	1.3.2	Fertiliser ✓✓		
	1.3.3	Pollination ✓✓		
	1.3.4	Integrated Pest Management ✓✓		
	1.3.5	Green house ✓✓	(5 x 2)	(10)
1.4	1.4.1	Diffusion ✓		
	1.4.2	Germination ✓		
	1.4.3	Monoculture ✓		
	1.4.4	Aquaculture ✓		
	1.4.5	Survey ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: PLANT STUDIES (NUTRITION)**

- 2.1 2.1.1 **Process represented by the chemical equation**
Photosynthesis ✓ (1)
- 2.1.2 **Compound B**
Glucose ✓ (1)
- 2.1.3 **Plant organs where compound B is found**
- Leaves ✓
 - Stems ✓
 - Roots ✓
 - Tubers ✓
 - Bulbs ✓
- (Any 2) (2)
- 2.1.4 **Methods of speeding up the rate of photosynthesis**
- Use of greenhouses ✓
 - Pruning ✓
 - Trellising systems ✓
 - Using optimum plant density ✓
- (Any 2) (2)
- 2.2 2.2.1 **Functions of water in plants**
- Provides mechanical rigidity to cells ✓
 - Important in chemical reactions ✓
 - A universal solvent ✓
 - It serves as a transport medium ✓
 - Temperature regulation ✓
- (Any 2) (2)
- 2.2.2 **Adaptation of the plant to reduce transpiration rate**
- Leaves are reduced ✓
 - Photosynthesis occurs on stems ✓
 - Stems store water ✓
 - Stems are shiny to reflect heat waves and reduce transpiration ✓
- (Any 3) (3)
- 2.2.3 **Consequences of lack of adaptations to reduce water loss**
- Plant cannot carry out metabolism due to lack water ✓
 - Failure to regulate temperature ✓
 - Failure to transport minerals and products of photosynthesis ✓
 - Wilting ✓
 - Senescence ✓
- (Any 2) (2)
- 2.3 2.3.1 **Classification of inorganic fertiliser**
Inorganic fertiliser ✓ (1)

2.3.2 Examples of phosphorus fertilisers

- Superphosphate / mono-calcium phosphate ✓
- Raw/rock phosphate ✓

(2)

2.3.3 Percentage nitrogen in a fertiliser bag

$$N = 280 \text{ g} / 1\,000 \text{ g} \times 100 \text{ ✓}$$

$$= 28\% \text{ ✓}$$

(2)

2.3.4 Evidence of state regulation of fertiliser production

- Registration number ✓
- Act number 36 of 1947 ✓

(2)

2.4 2.4.1 Identification of structure C

Transport protein ✓

(1)

2.4.2 Identification of transport mechanisms**A** – Passive uptake ✓**B** – Active uptake ✓

(2)

2.4.3 Motivation of answers to QUESTION 2.4.2

- **A** does not require energy in the form of ATP while in **B** energy is required ✓

OR

- In **A** movement is along concentration gradient ✓ while in **B** movement is against concentration gradient ✓

(2)

2.5 2.5.1 Basal application

(1)

2.5.2 Broadcasting ✓

(1)

2.5.3 Foliar application ✓

(1)

2.5.4 Band placing ✓

(1)

2.5.5 Fertigation ✓

(1)

2.6 2.6.1 Deduction of an advantage of green manuring

Soil conservation ✓

(1)

2.6.2 Explanation of the advantage of using leguminous plants

Legumes form a mutually symbiotic relationship with nitrogen fixing bacteria, ✓ which improve the nitrogen content of the soil. ✓

OR

Legumes are rich in proteins ✓ upon being ploughed under as green manures they are decomposed by microbes to nitrogen containing compounds increasing the soil's nitrogen content. ✓

(2)

2.6.3 Advantages of green manuring

- Reduces soil erosion ✓
- Improves soil fertility ✓
- Improves soil structure ✓

(Any 2)

(2)

[35]

QUESTION 3: PLANT REPRODUCTION AND PROTECTION

- 3.1 3.1.1 **Name of plant propagation method**
Grafting ✓ (1)
- 3.1.2 **Labelling**
A – scion ✓
B – rootstock ✓ (2)
- 3.1.3 **Advantages of plant propagation method in QUESTION 3.1.1.**
 - Fruit trees can be produced with several varieties ✓
 - The appearance or form of a plant can be changed ✓
 - An undesirable trait can be corrected ✓
 - The scion can be grafted onto a healthier rootstock with a more vigorous root system ✓ (Any 2) (2)
- 3.1.4 **Examples of fruit trees propagated using grafting in South Africa**
 - Oranges ✓
 - Lemons ✓
 - Nartjie ✓
 - Grapes ✓
 - Macadamia ✓
 - Avocado ✓
 - Nectarines ✓
 - Apples ✓ (Any 2) (2)
- 3.2 3.2.1 **Name of phenomenon described in the passage**
Ablactation ✓ (1)
- 3.2.2 **Biological cause of ablactation in the passage**
Inadequate pollination/thrips ✓ (1)
- 3.2.3 **Climatic causes of ablactation**
 - Frost ✓
 - Excessive rain ✓
 - Wind ✓ (Any 2) (2)
- 3.2.4 **Methods of protecting crops from climatic factors mentioned in QUESTION 3.2.3**
 Frost – tunnels/greenhouses/mulching ✓
 Excessive rain – greenhouses/tunnels ✓
 Wind – Shade houses/wind breaks/greenhouses/tunnels ✓ (Any 2) (2)
- 3.3. **Matching propagation methods with appropriate plant**
- 3.3.1 cuttings ✓ (1)
- 3.3.2 bulbs ✓ (1)
- 3.3.3 tubers ✓ (1)
- 3.3.4 rhizomes ✓ (1)
- 3.3.5 runners ✓ (1)

- 3.4 3.4.1 **Meaning of acronym GMO**
Genetically Modified Organism ✓ (1)
- 3.4.2 **Advantage of GM technology mentioned in the passage**
Production of herbicide resistant plants ✓ (1)
- 3.4.3 **Other methods of plant improvement in addition to GM technology**
 - Selection ✓
 - Hybridisation ✓
 - Mutation ✓
(Any 2) (2)
- 3.5 3.5.1 **Environmental conditions that lead to rapid multiplication of pathogens**
 - Monocultures ✓
 - High planting densities ✓
 - High humidity ✓
 - High temperatures ✓
(Any 2) (2)
- 3.5.2 **Micro-organisms that cause diseases**
 - Viruses ✓
 - Bacteria ✓
 - Fungi ✓
(Any 2) (2)
- 3.5.3 **Measures for preventing spread of plant diseases**
 - Remove all weeds ✓
 - Avoid overcrowding plants ✓
 - Use disease resistant varieties ✓
 - Practise intercropping ✓
 - Disinfect pruning tools ✓
 - Practise crop rotation ✓
(Any 2) (2)
- 3.6 3.6.1 **Matching insects with the statements given**
(a) – A ✓
(b) – C ✓
(c) – B ✓ (3)
- 3.6.2 **Advantages of using the pest control method in QUESTION 3.6.1. (c)**
 - Not harmful to the environment ✓
 - No need to purchase expensive chemical pesticides ✓
(2)
- 3.6.3 **Non-chemical pest control methods**
 - Crop rotation ✓
 - Biological control ✓
 - Intercropping ✓
 - Mechanical control ✓
 - Burning ✓
(Any 2) (2)

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QUESTION 4: OPTIMAL RESOURCE UTILISATION

- 4.1 4.1.1 **Identification of drainage layouts**
A – Grid system ✓
B – Herringbone system ✓ (2)
- 4.1.2 **Letter for the drainage layout which can be used in the given cases**
 (a) B ✓
 (b) C ✓
 (c) A ✓ (3)
- 4.1.3 **Factors farmers should consider when installing pipe drainage systems**
 • Pipe diameter ✓
 • Depth of drains ✓
 • Drain slope ✓ (Any 2) (2)
- 4.2 4.2.1 **Example of a primary tillage implement**
 • Plough ✓
 • Ripper ✓ (Any 1) (1)
- 4.2.2 **Main aim of secondary tillage**
 • To break clumps of soil left by primary tillage implements ✓ (1)
- 4.2.3 **Differentiate between primary and secondary cultivation**
 Primary tillage tends to produce a rough surface finish ✓ whereas secondary tillage tends to produce a smoother surface finish. ✓ (2)
- 4.3 4.3.1 **Identification of instruments A and B**
A – Tensiometer ✓
B – Class A evaporation pan ✓ (2)
- 4.3.2 **Advantages of irrigation scheduling**
 • Minimises crop water stress ✓
 • Reduces the farmer's cost of water and labour ✓
 • Minimises waterlogging problems ✓
 • Increases crop yields and quality ✓ (Any 2) (2)
- 4.3.3 **Sources of water for irrigation**
 • Lakes / dams ✓
 • Permanent rivers / streams ✓
 • Aquifers / springs / boreholes ✓ (2)

4.4 4.4.1 **Identification of the farming system**
Precision farming ✓ (1)

4.4.2 **Identify a piece of equipment which plays a central role in the farming system in the scenario**
GPS ✓ (1)

4.4.3 **Deduction of TWO advantages of the system**

- Allows the farmer to compare harvest information and identify poor spots in lands ✓
- Allows the farmer to see exactly how much has been harvested from specific areas in the land ✓ (Any 2) (2)

4.4.4 **Other pieces of equipment required for successful implementation of precision farming**

- GIS maps ✓
- Computers ✓
- Satellites ✓ (Any 2) (2)

4.5 4.5.1 **Table showing the response of a farmer's crop to two watering regimes**

Year	Maize yield (t)	
	Rainfed	Irrigated
2010	80	90
2011	120	140
2012	80	82
2013	60	80
2014	90	110

Marking checklist

- Title ✓
- Units (t) ✓
- Correct rainfed yields ✓
- Correct irrigated yields ✓
- Correct years ✓
- Accuracy ✓ (6)

4.5.2 **Water delivery method which results in higher yields**
Irrigation ✓ (1)

4.5.3 **Justification for answer to QUESTION 4.5.2**
Irrigated fields had higher yields than rainfed fields over the 5 years ✓ (1)

4.5.4 **Prediction of what could have caused the results in 2012**
There were sufficient rains in 2012. ✓ As a result, there were no significant differences between irrigated and rainfed fields. ✓ (2)

4.5.5 **Challenges that limit the widespread adoption of irrigation systems**

- Lack of water sources ✓
- Cost of installation and maintenance of the irrigation systems ✓
- Lack of knowledge required to run and maintain the irrigation systems ✓

(Any 2)

(2)

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TOTAL SECTION B: 105

GRAND TOTAL: 150

