



Province of the
EASTERN CAPE
EDUCATION



**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2022

**AGRICULTURAL SCIENCES P2
MARKING GUIDELINE**

MARKS: 150

This marking guideline consists of 8 pages.

SECTION A**QUESTION 1**

1.1	1.1.1	A ✓✓		
	1.1.2	B ✓✓		
	1.1.3	B ✓✓		
	1.1.4	D ✓✓		
	1.1.5	C ✓✓		
	1.1.6	A ✓✓		
	1.1.7	D ✓✓		
	1.1.8	B ✓✓		
	1.1.9	C ✓✓		
	1.1.10	B ✓✓	(10 x 2)	(20)
1.2	1.2.1	D ✓✓		
	1.2.2	G ✓✓		
	1.2.3	B ✓✓		
	1.2.4	E ✓✓		
	1.2.5	C ✓✓	(5 x 2)	(10)
1.3	1.3.1	Fertilisers ✓✓		
	1.3.2	Gypsum ✓✓		
	1.3.3	Fertilisation ✓✓		
	1.3.4	Biotechnology ✓✓		
	1.3.5	Aquaculture ✓✓	(5 x 2)	(10)
1.4	1.4.1	Chlorosis ✓		
	1.4.2	fungicides ✓		
	1.4.3	Tensiometer ✓		
	1.4.4	Zero tillage / No till ✓		
	1.4.5	mulching ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: PLANT STUDIES (NUTRITION)****2.1 2.1.1 Plant organs where products of photosynthesis are stored**

- Leaves ✓
- Stems ✓
- Roots ✓
- Tubers ✓
- Bulbs ✓

(Any 2 x 1) (2)

2.1.2 Effect of climate change on photosynthetic rates

- The high atmospheric CO₂ ✓ / high temperatures ✓ associated with climate is expected to result in higher rates of photosynthesis ✓

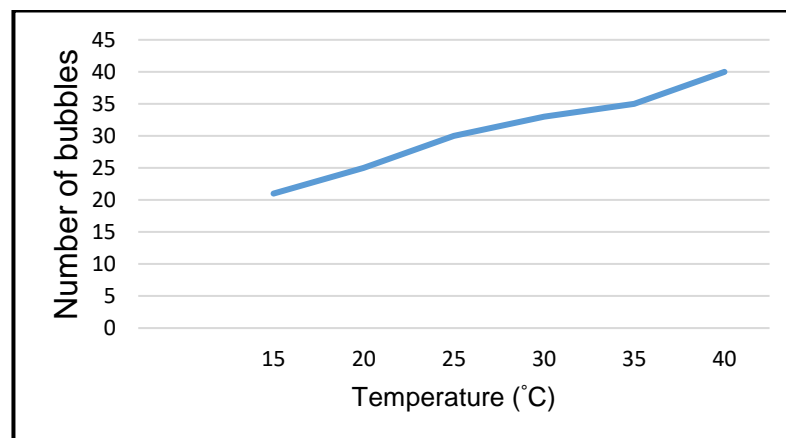
OR

- Extremely low temperatures ✓ will result in low photosynthetic rates ✓

OR

- Low rainfall ✓ will result in low photosynthetic rates ✓

(2)

2.2 2.2.1 Effect of temperature on the rate of photosynthesis (bubble release)**Marking checklist**

- Correct heading with both variables ✓
- Correct graph type ✓
- Units (°C) ✓
- y-axis: Correct labelling and calibration ✓
- x-axis: Correct labelling and calibration ✓
- Correct plotting (80% and more correct plotting) ✓

(6)

2.2.2 Description of trend shown in the graph

The higher the temperature, ✓ the higher the number of bubbles evolved. ✓

(2)

2.2.3 Methods of manipulating temperature

- Use of a greenhouse / tunnel ✓
- Plant density ✓
- Trellising plants ✓
- Pruning ✓

(Any 2 x 1) (2)

- 2.3 2.3.1 **Transport method**
A – Active transport ✓
B – Simple diffusion ✓
C – Facilitated diffusion ✓ (3)
- 2.3.2 **Difference between *osmosis* and *diffusion***
Diffusion is the movement of any substance from a region of its higher concentration to a region of its lower concentration, ✓ while osmosis is a special type of diffusion that involves movement water molecules from a region of their higher concentration to a region of their lower concentration ✓ (2)
- 2.3.3 **Functions of water in plants**
• Medium for metabolic processes ✓
• Temperature regulation ✓
• Structural support ✓
• Transport of nutrients /products of photosynthesis ✓ (Any 2 x 1) (2)
- 2.4 2.4.1 **Labels**
A – Phosphorus ✓
B – Potassium ✓
C – Micro ✓
D – Leaf chlorosis ✓ (4)
- 2.4.2 **Methods that can be used to determine the nutrient status of soils**
• Soil analysis ✓
• Plant analysis ✓ (2)
- 2.4.3 **Factors influencing nutrient availability**
• Soil texture ✓
• Soil pH ✓ (2)
- 2.5 2.5.1 **Classification of fertiliser**
Organic fertiliser ✓ (1)
- 2.5.2 **Physical benefits of animal manure mentioned in the passage**
• Improves soil structure ✓
• Increases water holding capacity ✓
• Improves drainage of clay soils ✓ (Any 2 x 1) (2)
- 2.5.3 **Potential dangers associated with the use of animal manure**
• May contain pathogens ✓
• Too much fertiliser can lead to eutrophication of water sources ✓ (2)
- 2.5.4 **Another type of manure that is not mentioned in the passage**
Green manure ✓ (1)

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QUESTION 3: PLANT REPRODUCTION AND PROTECTION

- 3.1 3.1.1 **Identification of pollination type**
Cross pollination ✓ (1)
- 3.1.2 **Pollination agent shown in the diagram**
Bee ✓ (1)
- 3.1.3 **Non-sexual parts of flower in the diagram**
• Petals / corolla ✓
• Sepals / calyx ✓ (2)
- 3.1.4 **Collective name of structures C and B**
• Pistil / Gynoecium ✓ (1)
- 3.1.5 **Name and function of structure E**
Anther ✓ – Produces pollen grains ✓ (2)
- 3.1.6 **Adaptations of the flowers for cross pollination**
• Different height of the stigma and anther ✓
• Different timings of maturation of stigma and anther ✓
• Self-sterility ✓ (Any 2 x 1) (2)
- 3.2 3.2.1 **Identification of process shown in the diagram**
Germination ✓ (1)
- 3.2.2 **Basic requirements for successful germination**
• Warmth ✓
• Moisture ✓
• Plant hormones ✓ (2)
- 3.2.3 **Methods of hastening germination**
• Priming / soaking seeds ✓
• Scarification ✓ (2)
- 3.3 **Identification of an example of a plant**
- 3.3.1 • Roses ✓ (1)
• Onions ✓ (1)
• Potatoes ✓ (1)
• Strawberries ✓ (1)
- 3.3.2 **Definition of *asexual reproduction***
Production of new plants ✓ without fusion of gametes ✓ (2)
- 3.3.3 **Disadvantages of asexual reproduction**
• Lack of genetic variation / reduced gene pool ✓
• Negative mutations are passed onto offspring ✓
• Less chances to survive environmental changes ✓ (Any 2 x 1) (2)

- 3.4 3.4.1 **Identification of micro-organisms**
- Virus ✓
 - Bacteria ✓
 - Fungi ✓
- (Any 2 x 1) (2)
- 3.4.2 **Identification of pathogen and its vector**
- Virus ✓ – Aphid ✓ (2)
- 3.4.3 **Modes of pathogen transmission**
- Infected seed or seedlings ✓
 - Infected clothing ✓
 - Infected tools and equipment ✓
 - Vectors such as sucking insects ✓
 - Spores which can be transmitted by wing or water ✓
- (Any 2 x 1) (2)
- 3.4.4 **Measures for preventing spread of plant diseases**
- Remove all weeds ✓
 - Avoid overcrowding plants ✓
 - Use disease resistant varieties ✓
 - Practice intercropping ✓
 - Disinfect pruning tools ✓
 - Practice crop rotation ✓
- (Any 2 x 1) (2)
- 3.5 3.5.1 **Identification of pest management method**
- Integrated Pest Management ✓ (1)
- 3.5.2 **Benefits of IPM**
- Not harmful to the environment ✓
 - Reduces need to purchase expensive chemical pesticides ✓
 - Less chemicals in food ✓
- (Any 2 x 1) (2)
- 3.5.3 **Challenges rural farmers might face in implementing IPM**
- Lack of knowledge ✓
 - Lack of funds to purchase chemical pesticides ✓
- (Any 2 x 1) (2)

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QUESTION 4: OPTIMAL RESOURCE UTILISATION

- 4.1 4.1.1 **Identification of cropping system**
Crop rotation ✓ (1)
- 4.1.2 **Benefits of crop rotation**
- Protects the farmer from total crop failure ✓
 - Maintains soil fertility ✓
 - Improves soil structure ✓
 - Controls pests and diseases ✓
 - Increases soil nitrogen content ✓ (Any 2 x 1) (2)
- 4.1.3 **Principles applied when designing a crop rotation programme**
- Crops that require the same nutrients should not follow each other ✓
 - Crops that are affected by the same pests and diseases should not follow each other ✓
 - Shallow rooted crops should be followed by deep rooted crops ✓ (3)
- 4.1.4 **Common name given to crops planted in Year 3**
Legumes ✓ (1)
- 4.1.5 **Role of legumes in a rotation programme**
Legumes form a symbiotic relationship with nitrogen fixing, ✓ which enables them to increase the soil's nitrogen content. ✓ (2)
- 4.2 4.2.1 **Methods of powering tillage**
- Human power ✓
 - Draft-animal power ✓ (2)
- 4.2.2 **Examples of tools that can be used during human powered tillage**
- Pick ✓
 - Hoe ✓
 - Mattock ✓
 - Rake ✓
 - Spade ✓ (Any 2 x 1) (2)
- 4.2.3 **Functions of soil tillage**
- To improve soil aeration and infiltration capacity ✓
 - To break up soil crusts ✓
 - Destroy weeds ✓
 - To incorporate fertilisers and organic matter into the soil ✓ (Any 3 x 1) (3)
- 4.2.4 **Differentiation of *primary* from *secondary cultivation/tillage***
Primary tillage cut and shatters the soil with deep penetration tools ✓ to produce a rough surface finish, ✓ whereas secondary tillage aims to level and firm the top part of the soil ✓ to produce a smoother surface finish. ✓ (4)

- 4.3 4.3.1 **Identification of structure in the picture**
Greenhouse / tunnel ✓ (1)
- 4.3.2 **Advantages of using greenhouses/tunnels**
- Crop damage due to frost and rain is eliminated ✓
 - Crops can be grown all year round ✓
 - High quality crops can be produced ✓
 - Yields can be improved ✓
 - Crops that would normally not grow in a particular area can be grown ✓ (Any 2 x 1) (2)
- 4.3.3 **Environmental conditions to be considered when selecting a location for a greenhouse**
- Light ✓
 - Temperature ✓
 - Relative humidity ✓
 - Plant diseases ✓ (Any 3 x 1) (3)
- 4.4 4.4.1 **Identification of process**
Irrigation ✓ (1)
- 4.4.2 **Sources of irrigation water**
- Lakes / dams ✓
 - Permanent rivers / streams ✓
 - Aquifers / springs / boreholes ✓ (Any 2 x 1) (2)
- 4.4.3 **Benefits of irrigation**
- Minimises crop water stress ✓
 - Increases crop yields and quality ✓ (2)
- 4.4.4 **Signs of poor-quality irrigation water**
- Salinity ✓
 - Turbidity ✓
 - Excess nutrients ✓
 - Specific ion toxicity ✓ (Any 2 x 1) (2)
- 4.4.5 **Consequences of using poor quality water for irrigation**
- Blocked pipes ✓
 - Corrosion of equipment ✓
 - Wilting of plants due to soil salinity ✓
 - Reduced marketability of produce due to unsightly deposits from irrigation water ✓ (Any 2 x 1) (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150