Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

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AGRICULTURAL SCIENCES P2 MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.

SECTION A

QUESTION 1.1

1.1.1 B √√

1.1.2 A √√

1.1.3 A √√

1.1.4 C √√

1.1.5 D √√

1.1.6 D √√

1.1.7 B √√

1.1.8 B √√

1.1.9 D √√

1.1.10 C √√

(10 x 2) (20)

QUESTION 1.2

1.2.1 E √√

1.2.2 F √√

1.2.3 G √√

1.2.4 H √√

1.2.5 B √√

(5 x 2) (10)

QUESTION 1.3

1.3.1 Vectors √√

1.3.2 Mesocarp √√

1.3.3 Stolons √√

1.3.4 Tensiometer √√

1.3.5 Soil drainage √√

(5 x 2) (10)

QUESTION 1.4

1.4.1 diffusion √

1.4.2 biological control √

1.4.3 micro/drip irrigation √

1.4.4 hydroponics √

1.4.5 corolla √

(5 x 1) (5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: PLANT NUTRITION

2.1 2.1.1 **Storage organs in plants**

- Roots √
- Stem √
- Leaves √
- Tubers √
- Fruits/seeds/nuts √ (Any 3 x 1) (3)

2.1.2 **Chemical process**

Photosynthesis √ (1)

2.1.3 **Requirements of the chemical process**

- Radiant/solar energy/sunlight √
- Sufficient carbon dioxide √
- Water √
- Chlorophyll pigment √
- Ideal temperature √ (Any 2 x 1) (2)

2.1.4 **Main product of the process stored in storage organs**

- Sugars/carbohydrates/organic food substances √ (1)

2.2 2.2.1 **Factors that influence upward water movement**

- Root pressure √
- Capillarity √
- Adhesion and cohesion √ (3 x 1) (3)

2.2.2 **The role played by xylem in water movement**

Water moves along xylem vessel √ to replace water lost via transpiration. √ (2)

2.2.3 **Functions of water in plants**

- Water transports nutrients from the soil to the roots and to the leaves. √
- Water transports the products of photosynthesis from the leaves to the plant organs for storage. √
- Water provides structural support to plants. √
- Water regulates plant temperature. √
- Water provides the medium for metabolic processes such as photosynthesis and respiration. √ (Any 2 x 1) (2)

2.2.4 **Osmosis**
It is a process where water molecules move from a high water potential √ through a differentially permeable membrane. √ (2)

Diffusion
It is the spontaneous movement of molecules from a region of high concentration to a region of low concentration, √ until it reaches a dynamic equilibrium. √ (2) (4)

2.3 2.3.1 a = nitrogen √
b = potassium √
c = calcium √ (3)

2.4 2.4.1 **Fertiliser that could provide better yield**
- Fertiliser bag A/The first fertiliser bag √ (1)

2.4.2 **Justification for fertiliser bag A**
- 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)

2.4.3 **Implications of (30) on the bag**
The figure 30 indicates the percentage mass of the fertiliser √ that actually contains the elements. √

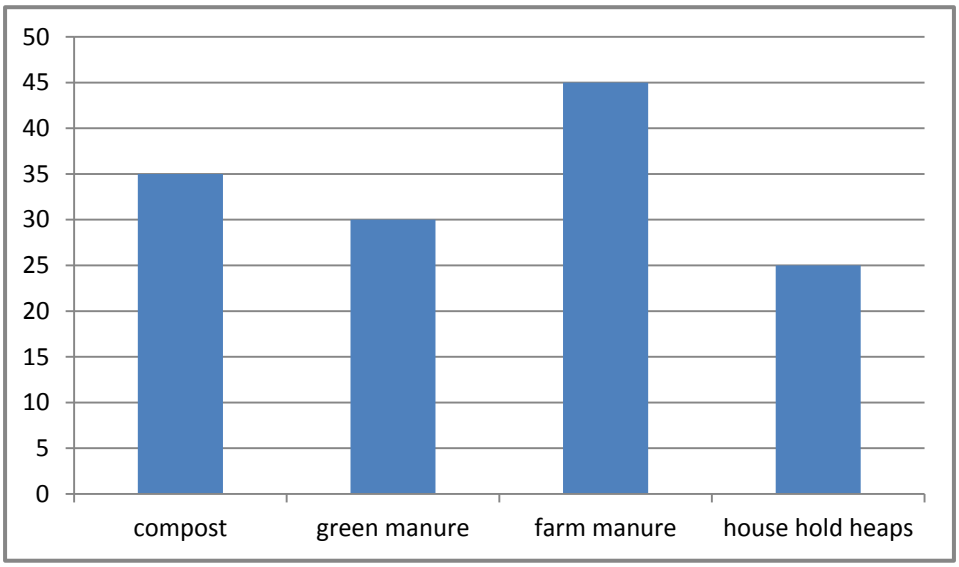
OR

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.PK. √ (2)

2.5 2.5.1 The performance of different organic fertilisers on the yield of maize.



Bar graph √ 1
Correct heading √ 1
Correct plotting/proportional plotting √ 1
Labelling and units on Y-axis √ 1
Labelling and units on X-axis √ 1 (5)

2.6 **Active ion uptake**

- It is the movement of nutrients against a concentration gradient/from a low to high concentration. √
- It is brought about by carrier molecule which is present in the cell membrane. √
- It requires metabolic energy/energy provided by ATP and a suitable enzyme. √ (Any 2 x 1)

Passive ion uptake

- Ions move from a higher to a lower concentration. √
- It does not need energy from metabolic reactions / ATP is not involved. √
- It occurs outside the casparian strip in the cortex. √ (Any 2 x 1) (4)

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QUESTION 3: PLANT REPRODUCTION

3.1 3.1.1 **Breeding process**
- Hybridisation √ (1)

3.1.2 **Justification of the process**
FIGURE 2 shows better yield √ than FIGURE 1. √
OR
FIGURE 3 shows better yield √ than FIGURE 1 and FIGURE 2. √ (2)

3.1.3 **Advantages of hybridisation**
- Hybridisation creates varieties that produce more yield. √
- Hybridisation produce plants that grow faster/better. √
- Hybridisation produces plants that are more resistant to pests and diseases. √
- Hybridisation produces plants that are resistant to cold and heat / unfavourable weather. √ (Any 2 x 1) (2)

3.2 3.2.1 **Parts of a flower**
9 = ovum √
3 = stigma √
4 = ovary √ (3)

3.2.2 **Function of flower stalk**
- It is the flower stalk that holds/supports the flower/fruit in place. √
- The flower stalk conducts water and nutrients from the plant to the flower. √ (Any 1 x 1) (1)

3.2.3 **Climatic conditions leading to ablactation**
- Low temperatures inhibits the germination of pollen and thus fruit setting. √
- Frost damage flowers. √
- Rain moisturises pollen and makes it not to disperse. √
- Strong winds blow away insects from pollinating the trees. √

(Any 3 x 1) (3)

3.3 3.3.1 **Methods of propagation**
FIGURE A – Grafting √

FIGURE B – Cutting √ (2)

3.3.2 **Reasons to practice vegetative propagation**
- Plants that do not produce seeds or viable seeds like roses can only be propagated by grafting or budding. √
- Plants propagated by budding or grafting are true to type. √
- It is very quick/easier/cheaper to propagate through cuttings. √
- Plants propagated by cutting and grafting, produce flowers/fruits faster. √ (Any 3 x 1) (3)

3.4 3.4.1 **Disease causing organisms**

(a) Viruses √
(b) Vectors √
(c) Fungi √
(d) Bacteria √ (4)

3.4.2 **Preventative measures for the spread of plant diseases**

- Use registered certified disease-free seed or other propagation material. √
- Disinfect pruning tools to prevent disease causing organisms from infecting plants through wounds. √
- Select cultivars that are resistant to bacterial diseases. √
- Practice crop rotation using crops that are not susceptible to diseases. √
- Fumigate storage places and greenhouses. √ (Any 3 x 1) (3)

3.5 3.5.1 **Selection**

It is the process in which environmental or genetic influences that will determine if an organisms √ thrive better than others as a factor of evolution. √ (2)

3.5.2 **Advantages of gene mutation**

- It provides breeding material for conventional plant breeding. √
- It contributes to the conservation and use of plant genetic resources. √
- It contributes to food security. √
- It provides additional income to farmers. √
- Desirable traits such as disease-resistance can be induced. √
- Plants can be muted to bear more fruits, flowers and seeds to increase production √ (Any 3 x 1) (3)

3.5.3 **Two important Bt crops in South Africa**

- Bt Maize √
- Bt Cotton √ (2)

3.5.4 **A natural or artificial breeding method**

- Selection √ (1)

3.6 **Reason why farmers should control weeds**

- Weeds compete with crops for moisture/space/nutrients and light. √
- Weeds interfere with the harvesting of crops. √
- Weeds serve as host plants for insects and pests. √
- Weeds that are thorny pose health hazards to other plants and animals. √

(Any 3 x 1) (3)

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QUESTION 4: ANIMAL REPRODUCTION

4.1 4.1.1 **Farming system**
Precision farming √ (1)

4.1.2 **Reasons for the use of computers and global satellites**
- To measure the correct environmental conditions. √
- To determine if crops are growing at maximum efficiency. √ (2)

4.1.3 (a) **Geographic Positioning System (GPS)**
To determine a precise position on the globe. √ (1)

(b) **Geographic Information System**
Computers capture, manage and analyse special data related to crop productivity and field inputs. / It makes sense of all the available data. √ (1)

4.2 4.2.1 **Best water source for sustainable irrigation**
- Rivers/bigger rivers √ (1)

4.2.2 **Water source not good for irrigation**
- Sea water √ (1)

4.2.3 **Criteria to determine water quality for irrigation**
- The salinity of the water because if plants absorb too much salt it affects crop yield/saline water is toxic to plants. √
- Determine specific electrical conductivity of water/the more salts dissolved, the higher the specific electrical conductivity. √
- Determine sodicity/sodium adsorption ratio/higher amounts of sodium ions (na^{+}) has detrimental effects on both soil and plants. √
- Determine toxic ions such as chloride and lithium. √ (Any 2 x 1) (2)

4.2.4 **Example of flood irrigation**
- Basin/border irrigation √
- Furrow irrigation √
- Bed irrigation √ (Any 1 x 1) (1)

4.3 4.3.1 **Drainage layouts**

A – Parallel/grid drainage system √
B – Herringbone drainage system √ (2)

4.3.2 **Factors to consider before installing pipe drain system**

- Soil information √
- Wetland impact √
- Economic feasibility regarding installation costs √
- Present and future cropping strategies. √
- Environmental impacts associated with drainage discharge. √
- Easements and right of way to avoid any potential conflict. √
- Spacing of drains √
- Pipe diameter √
- Drain slope or gradient √
- Layout of drains √ (Any 2 x 1) (2)

4.3.2 **Disadvantages of open drains**

- High maintenance cost of cleaning or removing fallen material. √
- Ditches may serve as breeding ground for weeds and insect pests. √
- Restricts accessibility of vehicles. √
- Some field operations cannot be done freely using heavy farm machinery. √ (Any 2 x 1) (2)

4.4 4.4.1 **Difference in aspects of monoculture and crop rotation**

Monoculture	Crop rotation
(a) The same crop is planted each year/The plants take the same mineral nutrients from the soil each year. √	(b) Different crops are planted each year. The plants will take different nutrients from the soil each year. √
(c) Diseases and pests settle in the soil and will be very hard to remove. √	(d) Disease and pests are easier to control because the diseases and pests of one crop may not affect other crops. √

(4)

4.5 **(a) Primary soil tillage/cultivation**

It involves the first intensive operation, √ which cut, turn and shatter the soil with relatively deep penetrating implements. √ (2)

(b) Secondary cultivation/tillage

It comes after primary tillage. / It involves seedbed finishing operations √ such as pulverising, levelling, firming the top soil, weed control, destroying soil crust and ridging. √ (2) (4)

4.6 4.6.1 **Managerial practices**

- Regular stocking √
- Feeding √
- Protection from predators √ (Any 2 x 1) (2)

4.6.2 **Common species stocked in South Africa**

- Bluefish/shad/elf √
- Trout √
- Abalone √
- Seaweed √
- Oysters √
- African catfish √
- Prawns √
- Mussels √
- Tilapia √ (Any 2 x 1) (2)

4.6.3 **Open-through flow system**

An open through flow system allows water to pass through the system once before it is discharged √ and can be used in indoor tanks, if there is an abundant and continuous supply of good quality water. √ (2)

4.7 4.7.1 Greenhouse √ (1)

4.7.2 **Environmental factors to consider**

- Morning sunlight in the east √
- Slope / well drained land √
- Source of water supply √
- Electricity supply √
- Accessibility by trucks and other vehicles √
- Consider the direction of storm water √
- Temperature √
- Plant diseases and pests √ (Any 2 x 1) (2)

4.7.3 **Materials for greenhouse**

- Transparent / micron plastic / polyethylene √
- Shade nettings / cloth √
- Glass √ (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150