CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

SOUTHERN ZONE JOINT EXAMINATIONS SYNDICATE

FORM FOUR PRE – NATIONAL ASSESSMENT, 2025

AGRICULTURAL SCIENCE-2

MARKING SCHEME

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1. (a)

	Initial Litmus paper colour changes	
BEAKER	**Blue litmus**	**Red litmus**
S1	red	red
S2	blue	blue
	Final Litmus paper colour changes	
BEAKER	**Blue litmus**	**Red litmus**
S1	blue	Red/blue
S2	blue	blue

(0.5x4=4 marks)

(b)

(i)Removes soil particles to obtain a clear filtrate for accurate pH testing

(1 marks)

(ii) Distilled water is neutral (pH 7), avoiding contamination from minerals or chemicals in tap water that could alter results.**(1 marks)**

(iii) S1: Acidic soil **(0.5 marks)**

S2: Basic soil **(0.5 marks)**

(c)(i) Importance for farmers (2 marks)

- Determines soil pH to guide crop selection.
- Identifies need for soil amendments (e.g., lime).

(ii) To evaluate the amount needed and effectiveness of lime in neutralizing acidity.

(d)

Acidic soil (S1) shows pH increase (blue litmus may remain blue/red litmus turns blue) While Basic soil (S2) may show minimal change **(1marks)**

Implication: Farmers learn lime adjusts pH but may not affect already alkaline soils. **(1 marks)**

(e) (i) Effects of over-application of $CaCO_3$ (1x5=5 marks)

- Raises pH excessively, causing nutrient imbalances (e.g., iron deficiency).
- Reduces microbial activity.
- Hardens soil structure.

- Leaches essential nutrients.
- Toxic build-up of calcium.
- Harm plant roots

(ii) **(iii) Alternatives to $CaCO_3$ (3 marks)**

- Wood ash.
- Dolomite lime.
- Organic compost.

(f) Long-term actions for persistently acidic soil (3 marks)

- Regular organic matter addition.
- Use sulfur to lower pH if over-limed.
- Plant acid-tolerant crops.

(g)Soil pH and nutrient availability (2 marks)

- Low pH reduces phosphorus availability.
- High pH limits iron/manganese uptake.

(h) Crop preferences (2 marks)

- **Acidic soils:** Tea, coffee
- **Alkaline soils:** puddy, cabbage.

2. (a) **(i)Difference in movement (1x2=2 marks)**

H1 flows slowly/thickly

H2 flows faster/watery.

(ii) H1 **(justified by slow movement) (1 marks)**

(iii) **1x2=2 marks**

- Blotting Paper or Paper Towel Test
- Fire Test
- Heat Test
- tablespoon Test
- Iodine Test
- he Water Test

(iv**) 1x2=2 marks**

- Water
- Sugar
- glucose

(v) **1x3=3marks**

- Ensures quality for health benefits.
- Prevents economic fraud.

- Maintains consumer trust.

(B) Maize Spacing

i. Spacing used (2 marks)

30 cm × 10 cm

ii. Seeds per hectare (3 marks)

- **Data given(0.5 marks)**
- **Formula (1 marks)**
- **Calculation (2 marks)**
- **Answer (o.5 marks)**

10,000 m² ÷ (0.3 m × 0.1 m) = 333,333 seeds.

(iii) **Total seed weight (2 marks)**

Calculation: 333,333 × 0.5 g = 166,666.5 g = 166.67 kg.

(iv) 1x5=5 marks

- Crop variety.(Growth habit or patterns of the crop)
- Soil fertility status
- Moisture availability
- Machinery used
- Number of seeds/plants per hole:
- Proneness of field to soil erosion
- Whether the crop is pure stand or intercropped
- The purpose for which the crop is intended

(v) **1x3=3 marks**

- Reduces competition for nutrients.
- Ensures adequate sunlight.
- Facilitates pest management

(v**i) 0.5x2=1 marks**

- Use planting ropes.
- Mechanical seeders

TOTAL MARKS: 50

Note: Award partial marks for incomplete answers where applicable. Observations in 1(a) must match expected pH reactions. Calculations must show correct units.