THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

134/2 **AGRICULTURE 2**

(For Both School and Private Candidates)

Time : 3 Hours **ANSWERS** **Year : 2005**

Instructions

1. This paper consists of sections **three (3)** questions.
2. Answer **two (2)** questions.
3. Question one (1) carries **twenty (20)** marks and questions **two (2)** and **three (3)** carries **fifteen (15)** marks each.
4. Non-programable calculators may be used.
5. Cellular phones are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

1. You are provided with specimens: H1, H2, H3, I1, I2, I3, I4, J1, J2, J3, J4, and J5.

(a) (i) Identify specimens H1, H2, and H3
H1 is a nitrogen fertilizer (urea), H2 is compost, and H3 is a gearbox gear.

(ii) State two types of specimen H1 and their functions in soil fertility
The two types of urea fertilizers are granular and prilled. Granular urea is used for slow nutrient release in the soil, while prilled urea dissolves quickly, providing immediate nitrogen to crops. Both types enhance vegetative growth and increase yield.

(iii) Outline three indicators that would show specimen H1 is no longer effective
Indicators include yellowing of leaves despite application, poor crop growth, and crusting of fertilizer in the soil preventing nutrient absorption.

(iv) Name the unit of the tractor system in which specimen H3 is used and explain its principle
H3 is part of the tractor gearbox unit. Its principle is to engage different gears to regulate torque and speed from the engine to the wheels, enabling the tractor to perform efficiently under varying loads.

(b) (i) Identify specimens I2, I3, and I4
I2 is a hydraulic cylinder, I3 is a brake drum, and I4 is a PTO shaft.

(ii) State the uses of specimens I1, I2, and I4
I1 (steering wheel) is used to control direction, I2 (hydraulic cylinder) operates implements like ploughs and loaders, and I4 (PTO shaft) transmits mechanical power to auxiliary implements.

(iii) Differentiate between the functions of specimens I3 and I4
I3 (brake drum) is used to slow or stop the tractor, while I4 (PTO shaft) is used to drive external machinery such as water pumps or milling equipment.

(c) (i) Identify specimens J1, J2, J3, and J4
J1 is maize, J2 is cassava, J3 is storage weevil, and J4 is sorghum.

(ii) Show their correct arrangement and indicate the type of fitting used when joining specimen J5
In a storage structure, J1, J2, and J4 should be stored separately to prevent cross-infestation. J5 (storage container lid) is fastened with a screw fitting to secure grains from pests.

2. You are provided with specimens: K1, K2, L1, L2, and L3, and the following apparatus: 100 cm³ measuring cylinder, 100 cm³ beaker, stirring rod, spatula, distilled water, and blue and red litmus papers.

Procedure:
(i) Measure 50 cm³ of distilled water and pour it into a beaker.
(ii) Add five spatulafuls of specimen K1 into the water and stir thoroughly.
(iii) Dip red and blue litmus papers into the mixture and record observations.

(a) Record the observations of both litmus papers
Red litmus turns blue, indicating an alkaline reaction, while blue litmus remains blue.

(b) State the pH of specimen K1 based on your observations
The pH is likely above 7, approximately 8–9, indicating alkaline nature.

(c) Explain, in two points, why farmers use specimen K1 in soils for cabbage production
K1 (lime) neutralizes acidic soils, creating a favorable pH for cabbage growth and improves nutrient availability.

(d) State why the specimen may not be suitable for coffee grown in semi-arid regions
Excessive alkalinity from K1 may reduce coffee nutrient uptake and cause stunted growth in already poor soils.

(e) Suggest a management practice to address the limitation in part (d)
Apply K1 in moderation and combine with organic matter to buffer soil pH.

(f) State three precautions to observe when using specimen K1
Wear protective gloves and mask, avoid inhalation of dust, and prevent contact with eyes.

(g) Write three functions of the nutrient elements present in specimen K1
Calcium strengthens cell walls, improves root growth, and reduces soil acidity; magnesium (if present) assists in photosynthesis; potassium enhances water regulation and enzyme activation.

3. You are provided with specimens: M1, M2, N1, N2, and N3.

Procedure:

(i) Measure the spacing between and within rows for plants in experimental setups M1 and M2 using a ruler.

(ii) Record the number of plants that can be grown per hectare for setup M1.

(iii) Calculate the viable seed requirement for setup M2 if each seed weighs 0.5 g.

(a) Record the spacing measurements for both setups

Assume M1 spacing is 75 cm × 30 cm, and M2 spacing is 60 cm × 25 cm.

(b) Calculate the plant population per hectare for setup M1

Area per plant = 0.75 m × 0.3 m = 0.225 m^2

Plants per hectare = 10,000 m^2 ÷ 0.225 m^2 ≈ 44,444 plants/ha

(c) Calculate the seed requirement per hectare for setup M2

Area per plant = 0.6 m × 0.25 m = 0.15 m^2

Plants per hectare = 10,000 ÷ 0.15 ≈ 66,667 plants

Seed weight = 66,667 × 0.5 g = 33,333.5 g ≈ 33.33 kg/ha

(d) Explain five factors that guide farmers in determining the plant spacing

- Crop type and growth habit (tall vs. dwarf varieties)
- Soil fertility and moisture availability
- Mechanization and ease of weeding or harvesting
- Expected plant population for optimum yield
- Pest and disease management, allowing airflow and reducing spread