THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL OF TANZANIA

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

735 AGRICULTURE TEACHING METHODS

Time: 3 Hour. **ANSWERS** **Year: 2002**

Instructions

1. This paper consists of section **A** and **B**.
2. Answer **all** questions in section A, and **four (4)** questions from section B.
3. Section A carry **forty (40)** and section B carries **sixty (60)** marks.
4. Cellular phones are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

1. List four examples of vegetative propagation methods used in crop production.

Cuttings involve planting pieces of stems, roots, or leaves that can grow into a new plant, such as in cassava or sweet potatoes.

Grafting is the joining of two plant parts, usually from different plants, so that they grow as one. It is commonly used in fruit trees like mangoes and oranges.

Layering involves bending a low branch to the ground, covering part of it with soil so it develops roots, then cutting it off as a new plant. This is used in plants like roses.

Division involves separating an established plant into sections, each with roots and shoots, then planting them separately. This is common in crops like bananas and sugarcane.

2. Mention four benefits of farm budgeting in school agricultural projects.

Farm budgeting helps estimate the total costs required for inputs, labor, and maintenance, preventing resource shortages during the project.

It enables better planning by identifying how resources will be allocated across activities, ensuring the smooth running of operations.

Budgeting helps in monitoring and controlling expenses, which increases accountability in student-led projects.

It supports evaluation by comparing expected income and expenses against actual results to determine profitability.

3. State four types of irrigation used in Tanzania.

Surface irrigation involves directing water across the surface of the land using furrows or basins, common in rice farming.

Sprinkler irrigation uses overhead pipes that spray water like rainfall, suitable for vegetable crops and field crops.

Drip irrigation delivers water slowly to plant roots through pipes and emitters, conserving water and nutrients.

Manual irrigation is done by using buckets or watering cans to apply water to plants, often used in small gardens or school projects.

4. Identify four common signs of heat in female cattle.
Restlessness or increased movement is a key sign that a female cow is in heat.

Mounting other cows or standing still when mounted indicates she is ready for mating.

Swollen and moist vulva with a clear mucus discharge is a physical sign of heat.

Reduction in feed intake and decrease in milk yield are behavioral changes observed during heat.

5. Give four advantages of using organic manure over chemical fertilizers.

Organic manure improves soil structure and moisture retention by increasing organic matter in the soil.

It releases nutrients slowly, reducing the risk of nutrient leaching and pollution compared to chemical fertilizers.

It encourages the activity of beneficial soil organisms, enhancing nutrient cycling and soil health.

Organic manure is often locally available and cheaper, making it accessible for schools and small-scale farmers.

6. List four post-harvest practices carried out on harvested maize.

Drying the maize under the sun reduces moisture content to safe levels for storage.

Shelling involves separating the grains from the cobs, either manually or mechanically.

Cleaning removes chaff, dust, or foreign materials, ensuring safe storage and quality of maize.

Storage in dry, aerated containers or bags prevents mold and pest damage during the storage period.

7. Explain five reasons why record keeping is important in managing a school poultry project.

It helps monitor feed consumption per bird, which is important for assessing feed efficiency and adjusting diets if needed.

Record keeping tracks egg production per day or per hen, helping in identifying productive and nonproductive birds.

Health and vaccination records allow for timely disease management and assessment of treatment effectiveness.

Financial records show expenses and income, enabling evaluation of project profitability and planning.

Breeding and mortality records help in identifying problems in flock management and making informed decisions.

8. Describe five characteristics of hybrid maize seeds that make them preferable to local varieties.

They have high yield potential due to selective breeding for productivity under various conditions.

Hybrid seeds mature faster, allowing for earlier harvests and reducing the risk of losses from late-season drought.

They show better resistance to diseases such as maize streak virus and leaf blight.

Hybrid maize plants grow more uniformly, simplifying weed control and harvesting operations.

They often have improved grain quality in terms of size, color, and storage durability.

9. Discuss five common causes of spoilage in stored food crops.

High moisture content in grains or storage areas promotes fungal growth and rot.

Poor ventilation leads to buildup of heat and humidity, encouraging spoilage and insect infestation.

Inadequate pest control allows insects like weevils or rodents to damage stored crops.

Storage in dirty or previously infested containers reintroduces pathogens and contaminants.

Delayed drying before storage means crops retain moisture, leading to microbial spoilage.

10. A farmer applied 25 kg of DAP fertilizer containing 18% nitrogen and 46% phosphorus on 0.5 hectares of maize.

(a) **Calculate the total nitrogen applied.**

Total nitrogen = 18% of 25 kg

= 18/100 x 25 = 4.5 kg of nitrogen

(b) **Calculate the total phosphorus applied.**

Total phosphorus = 46% of 25 kg
= 46/100 x 25 = 11.5 kg of phosphorus

(c) **What is the average rate of nitrogen application per hectare?**
Rate per hectare = 4.5 kg ÷ 0.5 ha = 9 kg/ha

(d) **Suggest two effects of excess phosphorus in the soil.**
It can lead to nutrient imbalance, especially reducing the availability of zinc and iron in the soil.

Excess phosphorus may cause water pollution when it runs off into nearby water bodies, leading to algal blooms.

(e) **State two benefits of calculating nutrient application rates in crop production.**
It helps avoid over-application, which can waste resources and damage the environment.
It ensures crops receive adequate nutrients for optimum growth, improving yield and quality.

11. Explain five precautions to be taken when spraying pesticides on vegetable crops in school gardens.

Pesticides should always be applied following the manufacturer's instructions on the label. This ensures the correct dosage and prevents damage to crops, the environment, or health of the users.

Spraying should be done in the early morning or late evening when temperatures are lower and there is little wind. This prevents evaporation and drift of chemicals to unintended areas.

Protective clothing such as gloves, goggles, masks, and long-sleeved garments must be worn during spraying to prevent contact with harmful chemicals.

Vegetables should not be harvested immediately after spraying. A waiting period (pre-harvest interval) must be observed to allow the chemicals to break down and avoid poisoning.

All spraying equipment should be cleaned after use and stored safely to prevent contamination of water sources or food items. Empty containers must be disposed of properly and not reused.

12. A livestock project kept 15 goats. Each goat consumed 2.5 kg of feed daily for 30 days. (a) **Calculate the total feed consumed during the period.**
Feed per goat = 2.5 kg/day
Total days = 30
Number of goats = 15
Total feed = 2.5 x 30 x 15 = 1,125 kg

(b) **If the cost of 1 kg of feed is 1,200 TZS, find the total cost of feed.**
Cost per kg = 1,200 TZS
Total feed = 1,125 kg
Total cost = 1,125 x 1,200 = 1,350,000 TZS

(c) **What is the average feed cost per goat per day?**
Total cost per day = 1,350,000 ÷ 30 = 45,000 TZS/day Cost
per goat per day = 45,000 ÷ 15 = 3,000 TZS

(d) **Give two reasons for monitoring feed consumption in livestock projects.**
Monitoring helps detect early signs of disease or stress in animals, as changes in feeding patterns may indicate health problems.
It helps in budgeting and controlling feed costs by identifying consumption trends and reducing waste.

(e) **Suggest two ways of reducing feed cost in school livestock projects.**
Growing fodder crops such as napier grass or legumes can reduce dependency on purchased feed. Using crop residues and kitchen waste (where safe) as supplementary feed can lower overall feeding expenses.

13. Prepare a lesson plan summary on "Methods of Crop Propagation." Include:
(a) Objectives
Students should be able to define crop propagation and distinguish between sexual and asexual propagation methods.

(b) Key content
Definition of propagation; sexual (using seeds) vs asexual (cuttings, grafting, layering, division); examples of crops for each method.

(c) Teaching aids
Samples of seeds, cuttings, grafting knife, live plants, charts showing propagation types.

(d) Learning activities
Discussion, demonstration of propagation methods, group practice of cuttings or grafting, and questionand-answer session.

(e) Assessment and conclusion
Oral questions and short written test. Conclusion: Emphasize that the right propagation method improves yield and crop quality.

14. Write a project report on vegetable farming carried out in your school. Include:
(a) Aim of the project

To equip students with practical skills in growing and managing vegetable crops like spinach and amaranthus.

(b) Methods used
Land was prepared by clearing, ploughing, and making beds. Seeds were sown directly, watered daily, weeded regularly, and organic manure was applied.

(c) Results and analysis
Harvested 80 kg of spinach and 65 kg of amaranthus. Crops showed healthy growth. 10% loss due to pest attacks. The vegetables were sold, and income recorded.

(d) Lessons learned
Timely weeding, regular watering, and proper spacing influence yield. Pest management is essential from the early stages.

(e) Challenges and solutions
Water shortage during dry days was managed by mulching and organizing watering schedules. Pest problem reduced using neem-based spray.

15. Write an essay explaining five criteria for selecting livestock breeds for school farming projects, and five risks involved in livestock production.

Livestock breed selection should consider adaptability to the local environment to ensure animals remain healthy and productive under local conditions.

The breed's feed efficiency must be assessed to ensure that it can convert feed into body weight or milk economically, especially under limited resources.

High productivity in terms of milk, meat, or egg yield is important to meet the project's goals and provide measurable benefits.

Disease resistance is key, as some breeds are more resistant to common infections and parasites, reducing veterinary costs and losses.

Availability and affordability of the breed locally are practical concerns. Breeds that are rare or expensive may not suit school projects with limited budgets.

Risks include disease outbreaks which can cause death or reduced productivity if not managed promptly.

Poor feed quality or shortage can lead to malnutrition and affect growth, reproduction, and overall output.

Extreme weather conditions such as drought or floods can damage shelters and lead to health problems.

Market price fluctuations for livestock or their products can reduce expected income from the project.

Theft or predators may lead to loss of animals, especially if security and housing are not adequate.

16. Describe five stages in preparing silage and explain five reasons why silage is important in school animal feeding programs.

The first stage in preparing silage is harvesting the forage crop, such as maize or napier grass, at the right stage of maturity when nutrient content is highest.

The second stage is chopping the forage into small pieces to increase surface area, which improves packing and fermentation efficiency.

The third stage is packing the chopped material tightly into a silo or pit to remove as much air as possible. This prevents spoilage by aerobic microorganisms.

The fourth stage is sealing the silo using plastic sheets or other airtight materials to ensure an anaerobic environment that promotes proper fermentation.

The final stage is allowing the material to ferment for about 21 to 30 days before opening and feeding it to animals.

Silage is important because it provides high-quality feed during dry seasons when green fodder is scarce, maintaining livestock productivity year-round.

It reduces feed wastage by preserving nutrients in the forage that would otherwise deteriorate after harvest.

Silage helps balance animal diets with energy and fiber, especially for dairy cows and growing livestock.

It allows for bulk storage of feed, which is convenient and cost-effective for school animal units.

Silage production also teaches students about feed conservation methods, improving their practical skills in animal nutrition management.

17. A student group is planning to grow tomatoes. Describe five key stages they must follow from land preparation to harvesting and explain five problems they may face during the project.

The first stage is land preparation, which involves clearing, tilling, and making ridges or raised beds for good drainage and root development.

The second stage is nursery establishment, where seeds are sown in a seedbed or trays, watered regularly, and protected from pests until ready for transplanting.

The third stage is transplanting, where healthy seedlings are moved to the main field and spaced properly to ensure good air circulation and access to sunlight.

The fourth stage is crop management, including regular watering, weeding, staking, applying manure or fertilizer, and controlling pests and diseases.

The final stage is harvesting, where ripe tomatoes are picked carefully to avoid bruising and sorted for sale or storage.

Problems may include pest attacks such as tomato hornworms or aphids, which can damage leaves and reduce yield.

Diseases like blight or bacterial wilt can spread quickly in humid conditions and destroy entire plants.

Water shortages or irregular watering can cause fruit cracking or blossom-end rot.

Lack of proper staking can lead to fruit touching the ground and rotting.

Poor market access or low prices may reduce expected income and discourage students.

18. Discuss five ways of integrating agriculture with other subjects in the school curriculum and explain five benefits of such integration to learners.

Agriculture can be integrated with biology by teaching plant and animal physiology, enabling learners to relate theory to actual farm practices.

Mathematics can be linked to agriculture through budgeting, measuring land areas, calculating feed ratios, and yield estimation.

Geography is integrated when learners study climate, soil types, and natural vegetation, which affect agricultural practices.

Agriculture and English can be combined through report writing, record keeping, and reading agricultural texts to improve language and communication skills.

ICT can support agriculture by introducing digital tools for data collection, farm record keeping, and accessing agricultural information online.

Integration enhances practical understanding by showing learners how classroom theory connects with reallife agricultural activities.

It promotes interdisciplinary thinking, where students learn to solve problems using knowledge from various subjects.

Learners develop teamwork and communication skills through group farm projects that involve multiple disciplines.

Integration fosters creativity and innovation as students apply scientific, mathematical, and technological knowledge to improve farming techniques.

It increases the relevance of agriculture as a subject, making it more engaging and encouraging students to consider agriculture as a career option.