THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

735 AGRICULTURE TEACHING METHODS

Time: 3 Hours **ANSWERS** **Year: 2014**

Instructions

1. This paper consists of section A and B with a total of sixteen questions.

2. Answer all questions in section A and four questions from section B.

1. Briefly describe four components of the agriculture science syllabus.

The general objectives outline the overall learning goals for students, indicating what they should achieve by the end of the course. These objectives help guide teachers in lesson planning and evaluation.

The content section specifies the topics and subtopics to be covered within the syllabus. This includes theoretical concepts and practical agricultural skills to ensure comprehensive learning.

The teaching methods and strategies component suggests the most effective approaches to deliver agricultural lessons, such as demonstrations, fieldwork, and discussions. It helps teachers adopt appropriate techniques for different topics.

The assessment and evaluation section provides guidelines on how student performance should be measured through tests, assignments, practical exercises, and project work to ensure mastery of agricultural knowledge and skills.

2. Identify four components of the diesel system that a Form II student will learn from the "Fuel System".

The fuel tank stores diesel fuel and ensures a continuous supply to the engine through the fuel delivery system.

The fuel pump transfers fuel from the tank to the injectors at the required pressure, ensuring smooth engine operation.

The fuel injectors spray atomized fuel into the combustion chamber at high pressure, allowing efficient mixing with air for proper combustion.

The fuel filter removes impurities and debris from the diesel before it reaches the injectors, preventing engine damage and ensuring efficient fuel combustion.

3. State four conditions in which demonstration teaching and learning method must be adopted.

When teaching practical skills that require step-by-step explanation, such as grafting fruit trees or operating farm machinery, demonstration is necessary to enhance student understanding.

If the topic involves safety-sensitive procedures, such as handling agricultural chemicals or operating power tools, demonstration ensures that students learn the correct and safe methods.

When introducing new or complex agricultural concepts, such as soil testing or irrigation techniques, demonstration simplifies the subject by allowing students to observe the process directly.

In cases where visual learning is more effective than verbal explanations, such as recognizing plant diseases or identifying different soil types, demonstration provides a clearer understanding.

4. (a) Name two categories of instructional media.

Visual media includes charts, diagrams, videos, and agricultural models that aid in understanding concepts through sight.

Audio-visual media involves tools such as television, projectors, and digital simulations that combine sound and images for an interactive learning experience.

(b) Give three differences between a syllabus and a course curriculum.

A syllabus outlines the specific topics and content to be covered in a subject within a given time frame, while a curriculum includes all aspects of the educational program, including subjects, teaching strategies, and assessments.

A syllabus is a subset of the curriculum and focuses mainly on academic knowledge, whereas a curriculum covers broader educational elements, including extracurricular activities, student development programs, and teaching methodologies.

Syllabi are designed for specific subjects and are subject to periodic updates, while the curriculum defines the overall educational structure of an institution or national education system and undergoes more comprehensive revisions.

5. With examples, briefly explain four reasons for having agricultural science workshops in secondary schools.

Workshops provide hands-on skills development, allowing students to practice farm-related tasks such as carpentry, welding, and repairing farm tools, which are crucial for agricultural productivity.

They serve as learning spaces for farm machinery operation, where students can be trained to use tractors, plows, and irrigation pumps, ensuring they gain practical mechanization experience.

Workshops help in agricultural product processing, such as milk pasteurization, honey extraction, and seed treatment, giving students exposure to value addition techniques in agriculture.

They enhance research and innovation, allowing students to experiment with different agricultural technologies, such as solar dryers for crop preservation or hydroponic farming techniques.

6. Briefly describe four rules applied in the agriculture laboratory.

All students must wear protective gear, such as lab coats, gloves, and safety goggles, to prevent injuries when handling chemicals or sharp tools.

Food and drinks are strictly prohibited in the laboratory to prevent contamination and ensure a safe working environment for handling agricultural experiments.

All equipment and chemicals must be handled carefully and stored properly after use to prevent accidents, spills, or misuse by unauthorized individuals.

Students must follow all safety guidelines and instructor directions to avoid risks associated with chemical exposure, machinery operation, and biological experiments.

7. Mention four modern forms of communication which can be used in teaching and learning agriculture.

Online learning platforms such as Google Classroom and Zoom facilitate virtual lessons and information sharing on agricultural topics.

Mobile applications like FarmLogs and AgriSmart provide real-time agricultural information, including weather updates, pest control tips, and best farming practices.

Social media networks such as WhatsApp, YouTube, and Facebook allow teachers and students to share videos, images, and discussions related to agriculture.

Agricultural podcasts and webinars offer audio and video content from experts, allowing students to learn from experienced professionals in the field.

8. Being a classroom manager, specify four aspects to be done in ensuring good relations among learners in the classroom.

Promoting collaborative learning through group activities encourages teamwork and mutual respect among students.

Encouraging respect for diversity ensures that students appreciate different backgrounds, opinions, and learning styles, fostering inclusivity in the classroom.

Establishing fair classroom rules helps in maintaining discipline and equality, ensuring that no student feels marginalized or ignored.

Organizing interactive discussions and conflict resolution sessions allows students to express their views openly and resolve misunderstandings peacefully.

9. Enumerate four advantages of teaching and learning by excursion in Agriculture.

Excursions provide real-world exposure, allowing students to observe agricultural practices directly, such as irrigation systems and crop rotation methods.

They enhance practical knowledge by giving students hands-on experience in different agricultural settings, such as livestock farms or agro-processing industries.

Excursions encourage career motivation, as students interact with professionals in the agriculture sector and gain insights into potential career opportunities.

They foster environmental awareness, helping students understand sustainable farming techniques and conservation practices that benefit both agriculture and nature.

10. Briefly describe four factors to consider when constructing a classroom test.

The test validity should ensure that the questions accurately measure the intended learning objectives and subject knowledge.

The test reliability must be considered to ensure that if the same test is given multiple times, it produces consistent results.

The level of difficulty should be balanced to include both simple and challenging questions that cater to different student abilities.

The test format should be structured appropriately, using a mix of multiple-choice, short-answer, and essay questions to assess different cognitive skills.

11. Describe five major components of an agriculture science textbook.

The introduction section provides an overview of the book's objectives, target audience, and key topics to be covered.

The subject content presents well-organized information on agricultural principles, techniques, and practical applications.

The illustrations and diagrams enhance understanding by visually representing concepts such as soil profiles, crop diseases, and machinery parts.

The questions and exercises help students review and apply what they have learned through practice problems and discussions.

The glossary and index define key agricultural terms and provide an alphabetical listing of topics for easy reference.

12. (a) State the Law of Diminishing (Marginal) Returns.

The Law of Diminishing Marginal Returns states that as successive units of a variable input (e.g., labor or fertilizer) are added to a fixed input (e.g., land or machinery), the additional output (marginal product) from each extra unit of input will eventually decrease, assuming other factors remain constant. This means that after a certain point, increasing the input further results in less proportional gains in production and may even lead to inefficiency.

(b) Explain five types of costs in agricultural production.

Fixed costs remain unchanged regardless of the level of production. These include expenses like land rent, depreciation of machinery, and insurance payments, which must be paid even if production is at zero.

Variable costs change with the level of production. Examples include costs of seeds, fertilizers, pesticides, and labor wages, which fluctuate depending on how much is being produced.

Total costs refer to the sum of fixed and variable costs. It represents the overall expenditure incurred in agricultural production and helps farmers determine their profitability.

Average costs are calculated by dividing total costs by the quantity of output produced. It helps in determining the cost per unit of production, which is essential for pricing decisions.

Marginal costs refer to the additional cost incurred when producing one more unit of output. It helps in decision-making, such as whether increasing production will be profitable or lead to losses.

13. Suppose you are teaching a lesson on "Crop Production." Prepare a lesson note indicating learners' activities on the following aspects:

(a) Land preparation/Tillage
Learners will observe different tillage methods such as plowing, harrowing, and ridging. They will then participate in clearing land, removing weeds, and leveling the soil for planting.

(b) Planting
Students will be divided into groups to practice spacing and planting techniques using different crop seeds. They will compare row planting with broadcasting methods to understand their advantages and disadvantages.

(c) Weeds and Weed Control
Learners will visit a farm to identify common weeds and discuss their effects on crops. They will also demonstrate cultural, mechanical, and chemical methods of weed control, such as hand-pulling, hoeing, and herbicide application.

(d) Pests and Diseases and their Control
Students will research common pests and diseases affecting crops and present findings in class. They will practice identifying pest damage and demonstrate preventive control measures like crop rotation, pesticide application, and biological pest control.

(e) Harvesting
Learners will be taken to a farm where they will observe and practice proper harvesting techniques for different crops, including manual and mechanized methods. They will also discuss factors affecting crop maturity and post-harvest losses.

(f) Storage
Students will analyze various crop storage methods, such as granaries, silos, and airtight containers. They will engage in practical activities such as drying grains and treating stored produce to prevent pests and spoilage.

14. Explain five situations that force teachers to use the lecture method in teaching agriculture science subject despite its limitation as a non-participatory method.

When teaching large classes, the lecture method allows a single teacher to deliver content efficiently to many students at once, as interactive methods may be difficult to implement.

In cases where complex theoretical concepts need to be explained, such as the principles of genetics or soil chemistry, lectures help in providing structured and detailed explanations.

When time is limited, such as when covering broad syllabus content within a short period, the lecture method enables the teacher to quickly deliver essential information without lengthy activities.

For topics requiring historical or conceptual background, such as the evolution of agricultural practices or government policies on farming, lectures provide the necessary foundation before practical application.

When teaching resources are unavailable, such as when there is a lack of laboratory equipment, farm tools, or demonstration materials, teachers may rely on lectures to deliver knowledge.

15. Show five major insect pests of maize and state the damage symptom for each pest.

Stem borers (Busseola fusca & Chilo partellus) bore into maize stems and feed on plant tissues, causing wilting, stunted growth, and weak stems that may collapse.

Fall armyworm (Spodoptera frugiperda) feeds on maize leaves, creating irregular holes and reducing photosynthesis. Severe infestations can destroy the entire crop.

Maize weevils (Sitophilus zeamais) attack stored maize grains, creating small round holes in kernels, reducing grain quality and making it susceptible to spoilage.

Cutworms (Agrotis spp.) cut young maize seedlings at the base, leading to plant death and poor crop establishment in early growth stages.

Aphids (Rhopalosiphum maidis) suck sap from maize plants, causing leaf curling, yellowing, and stunted growth. They also transmit viral diseases such as Maize Streak Virus.

16. An agriculture science teacher laments, "with overloaded timetable, preparation of lesson plans is a waste of time." Criticize this statement basing on five importance of a lesson plan.

A lesson plan organizes teaching activities, ensuring that lessons follow a logical sequence and covering key points efficiently, which actually saves time in the long run.

It helps in resource allocation, ensuring that teaching aids, materials, and tools are prepared in advance, preventing last-minute rush and inefficiency.

Lesson plans improve lesson delivery, as teachers have clear objectives, instructional methods, and assessments outlined, leading to better student understanding and participation.

They provide a reference for substitute teachers, allowing continuity of lessons even when the main teacher is absent, preventing syllabus gaps.

Lesson plans enhance assessment and evaluation, ensuring that student progress is monitored effectively and necessary adjustments are made for improved learning outcomes.

17. Describe four advantages and four disadvantages of essay items in a classroom test.

Advantages:

Encourages critical thinking by allowing students to analyze, evaluate, and apply knowledge in a structured manner.

Tests deep understanding as students must explain concepts in their own words rather than guessing from multiple-choice options.

Allows creative expression, enabling students to present arguments, interpretations, and original ideas based on their understanding.

Minimizes guessing, as students must construct well-thought-out responses rather than selecting from predefined answers.

Disadvantages:

Time-consuming to answer, as students must write detailed responses, which may limit the number of questions that can be attempted in an exam.

Difficult to grade objectively, as different teachers may interpret responses differently, leading to variations in scoring.

Requires good writing skills, meaning students with weaker language proficiency may struggle to express their knowledge effectively.

May lead to incomplete responses, as students may run out of time before fully addressing all points, reducing their overall score.

18. Imagine you have been posted to a new school which has no school farm and you want to establish it. Describe the necessary steps to follow when planning a school farm.

Assessing available land is the first step to determine the suitability of the soil, water availability, and space for different farm activities. This helps in deciding what crops and livestock can be supported.

Seeking approval from school administration ensures that all necessary permissions are obtained, and support is given for budget allocation, labor, and land preparation.

Developing a layout plan involves designing where different sections, such as crop fields, livestock pens, and tool storage, will be located to optimize space and accessibility.

Securing farm inputs such as seeds, fertilizers, tools, and irrigation equipment is necessary before beginning farming activities. This includes ensuring availability of trained personnel to guide students.

Involving students in farm activities promotes practical learning and sustainability. A structured farm management plan should be created, detailing responsibilities and schedules for farm maintenance.