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 : 2007**

Instructions

1. This paper consists of sections **ten (10)** questions in sections A and B.
2. Answer **five (5)** questions choosing at least **two (2)** questions from each section.
3. Each question carries **twenty (20)** marks.
4. Cellular phones are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

SECTION A
CROP SCIENCE AND PRODUCTION

1. Briefly explain the concept of mutation breeding and its application in crop improvement.
   Mutation breeding induces genetic changes using mutagens to create variability, then selects useful mutants for traits like disease resistance, plant architecture, or maturity to broaden breeding material.

2. State five benefits of progeny testing in crop breeding.
   It verifies the genetic worth of parent plants, detects superior genotypes for heritable traits, estimates breeding values, reduces juvenile selection errors, and improves reliability of selecting lines for variety release.

3. Explain the following as used in weed science:
   (a) Crop rotation
   Changing crops in sequence to disrupt weed life cycles and reduce specific weed buildup.
   (b) Mulching
   Covering soil with organic or synthetic material to suppress weed emergence by blocking light.
   (c) Notorious weed
   A highly problematic weed known for invasiveness or serious crop competition; example: Striga in cereals.
   (d) Selective herbicide
   A herbicide that targets specific weed species or plant types while sparing the crop.

4. Briefly explain five environmental factors that affect the effectiveness of herbicides.
   Rainfall can wash off foliar sprays or activate soil herbicides.
   Temperature affects plant metabolism and herbicide uptake.
   Soil organic matter binds some herbicides, reducing availability.
   Humidity influences spray drying time and leaf uptake.
   Soil moisture affects seedling growth and activity of pre-emergence products.

5. Describe five symptoms of a viral infection in a plant, and explain two ways a viral infection can spread.
   Symptoms: mosaic or mottling, stunting, leaf curling or distortion, chlorotic ringspots, and reduced fruit set or yield.

Spread by insect vectors like aphids transmitting virus particles; spread by infected vegetative planting material such as tubers or cuttings.

SECTION B

LIVESTOCK SCIENCE AND PRODUCTION

6. Differentiate between carrying capacity and stocking density.
   Carrying capacity is the sustainable maximum number of animals that a land area can support without degradation.
   Stocking density is the actual animals per unit area at a given time, which may exceed or be below carrying capacity.

7. Briefly explain the role of the following nutrients in an animal's diet:
   (a) Vitamin A
   Supports vision, epithelial integrity, reproduction, and immune function.
   (b) Calcium
   Essential for bone structure, clotting, and milk secretion.
   (c) Phosphorus
   Important in bone formation, energy metabolism, and reproductive function.
   (d) Protein
   Supplies amino acids for tissue growth, repair, enzymes, hormones, and milk production.

8. Discuss three common diseases of poultry, stating their causative agents and symptoms.
   Newcastle disease caused by Newcastle disease virus: respiratory signs, nervous symptoms, diarrhea, and high mortality.
   Infectious bursal disease caused by IBD virus: immunosuppression and mortality in young birds with swollen bursa.
   Fowl pox caused by Avipoxvirus: wart-like lesions on skin and diphtheritic lesions in the mouth and respiratory tract.

9. Explain the importance of a good water supply for livestock production and state three factors that affect the water intake of an animal.
   Adequate water supports digestion, milk production, metabolic reactions, and thermoregulation; poor water supply restricts feed intake and productivity.

Factors: ambient temperature (high temperature increases intake), water quality (salinity or contamination reduces intake), and physiological state (lactation increases water requirement).

10. State five advantages and five disadvantages of using artificial insemination in livestock breeding.
    Advantages: rapid dissemination of superior genetics, disease control by reducing live-animal transfer, reduced need for keeping bulls, controlled mating and genetic progress, ability to use sires from distant locations.
    Disadvantages: requires skilled technicians, needs good heat detection, semen handling and storage infrastructure, lower conception if technique is poor, and potential loss of genetic diversity if overused.