**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 : 2004**

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**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).

1. (a) Define the following terms:

   (i) Quarantine in crop protection

   Quarantine in crop protection is the legal restriction of movement of plants or plant products to prevent the introduction and spread of pests and diseases.

   (ii) Host specificity

   Host specificity is the ability of a pest or pathogen to attack only certain plant species and not others.

   (iii) Insect vector

   An insect vector is an insect that transmits disease-causing organisms from one plant to another.

   (iv) Economic damage

   Economic damage refers to the level of pest injury that results in yield loss sufficient to justify the cost of control measures.

   (b) Identify three storage pests of cereals and describe their damage.

   Maize weevil bores into grains, creating holes and reducing grain weight and quality.

   Larger grain borer tunnels deeply into stored grains, causing complete destruction and powdering of kernels.

   Angoumois grain moth larvae feed inside grains, leaving hollowed-out seeds and webbing.

   (c) Suggest three measures of minimizing post-harvest losses.

   Proper drying of grains to safe moisture levels before storage.

   Use of airtight or improved storage structures to prevent pest entry.

   Regular inspection and fumigation of stores to control storage pests.

2. (a) Briefly explain the following breeding methods:

   (i) Mutation breeding

   Mutation breeding involves inducing genetic changes using physical or chemical agents to create desirable crop varieties.

   (ii) Marker assisted selection

   Marker assisted selection uses molecular markers linked to specific traits to identify and select plants with desirable genes.

   (iii) Bulk breeding

   Bulk breeding involves growing a population of segregating generations together and later selecting superior lines.

   (iv) Synthetic variety

A synthetic variety is developed by intercrossing several selected genotypes and maintaining them by open pollination.

(b) State three advantages of mutation breeding.

It creates entirely new traits not present in the parent material.

It is useful in improving specific traits like disease resistance.

It is faster than conventional breeding for developing variability.

(c) Describe four limitations of using synthetic varieties.

They require large seed production areas to maintain genetic diversity.

Genetic uniformity is low compared to hybrids, leading to inconsistent yields.

Performance may decline over generations due to random pollination.

They are costly to develop and maintain.

3. (a) Explain the role of crop husbandry practices in controlling plant diseases.

   Crop husbandry practices such as crop rotation, timely planting, use of clean planting material, and proper field sanitation reduce inoculum sources, break disease cycles, and lower the chances of disease spread.

(b) For each of the following plant diseases, describe causative agent, symptoms, and control:

(i) Groundnut rust

Causative agent: Puccinia arachidis fungus.

Symptoms: Small reddish-brown pustules on leaves leading to premature defoliation.

Control: Use resistant varieties, fungicide sprays, and crop rotation.

(ii) Rice blast

Causative agent: Magnaporthe oryzae fungus.

Symptoms: Diamond-shaped lesions on leaves and neck rot at panicle base.

Control: Resistant varieties, balanced fertilizer use, and fungicide application.

(iii) Coffee leaf rust

Causative agent: Hemileia vastatrix fungus.

Symptoms: Yellow-orange powdery lesions on underside of leaves causing leaf fall.

Control: Resistant coffee varieties, fungicide sprays, and pruning to improve aeration.

4. (a) Define:

   (i) Invasive weeds

Invasive weeds are non-native plant species that spread rapidly and outcompete crops and native vegetation.

(ii) Herbicide resistance

Herbicide resistance is the inherited ability of a weed population to survive application of a herbicide that previously controlled it.

(iii) Contact herbicides

Contact herbicides kill only the plant tissues directly touched by the chemical without translocation.

(b) (i) State three benefits of preventive weed control

It reduces costs of later weed management.

It prevents introduction of new invasive weeds.

It minimizes crop competition and yield loss from the start.

(ii) Mention four disadvantages of herbicide use in weed management

They may pollute soil and water.

Overreliance can lead to herbicide resistance in weeds.

They are expensive for smallholder farmers.

Incorrect use may injure crops and harm biodiversity.

(c) Explain four harmful effects of weeds in crop production.

Weeds compete with crops for nutrients, light, and water.

They act as alternate hosts for pests and diseases.

They increase cost of production through control measures.

They lower crop quality and hinder harvesting efficiency.

5. (a) Name three major groups of fungal diseases with examples.

Rusts such as wheat stem rust.

Powdery mildews such as barley powdery mildew.

Wilts such as Fusarium wilt of tomatoes.

(b) Outline:

(i) Four bacterial diseases of cereal crops

Bacterial leaf streak of rice, bacterial leaf blight of rice, black chaff of wheat, and corn bacterial wilt.

(ii) Three viral diseases of legumes

Bean common mosaic virus, cowpea mosaic virus, and groundnut rosette virus.

(iii) Four nutrient deficiency symptoms in crops

Nitrogen deficiency causes yellowing of older leaves.
Phosphorus deficiency leads to stunted growth and purpling of leaves.
Potassium deficiency shows marginal leaf scorching.
Iron deficiency results in interveinal chlorosis of young leaves.

(c) Describe the nature, symptoms, and control of maize streak disease.
Nature: A viral disease caused by maize streak virus transmitted by leafhoppers.
Symptoms: Yellow streaks running parallel to veins on leaves, stunted plants, and poor cob development.
Control: Plant resistant maize varieties, practice early planting, and control insect vectors.

SECTION B
6. (a) Differentiate between free range and backyard poultry production systems.
Free range system allows poultry to scavenge over large areas with minimal confinement, while backyard system keeps birds in small enclosures near homesteads with partial scavenging.

(b) State six advantages of free range poultry keeping.
Low cost of feeding since birds scavenge.
Improves meat and egg quality.
Birds get more exercise, leading to stronger health.
It requires little housing investment.
It is suitable for rural households with space.
Birds help in pest control by scavenging insects.

(c) List four disadvantages of backyard poultry system.
Higher risk of disease spread near homes.
Predation is common.
Productivity is low due to poor feeding.
Selective breeding is difficult to implement.

7. (a) Explain four harmful effects of protozoan parasites on livestock.
They cause diseases such as trypanosomiasis, leading to reduced productivity.
They lower fertility and growth rates.
They weaken animals, making them more susceptible to other infections.
They increase veterinary and management costs.

(b) Describe the symptoms and control of the following diseases:

(i) Trypanosomiasis in cattle

Symptoms: Fever, weight loss, anemia, swollen lymph nodes, and weakness.

Control: Use of trypanocidal drugs, tsetse fly control, and resistant breeds.

(ii) Mastitis in dairy cows

Symptoms: Swollen and painful udder, abnormal milk with clots, reduced yield.

Control: Proper milking hygiene, antibiotics, and culling of chronic cases.

(iii) Newcastle disease in poultry

Symptoms: Respiratory distress, greenish diarrhea, twisted necks, and sudden death.

Control: Vaccination, quarantine, and proper sanitation.

(c) Suggest four general measures for improving animal health on farms.

Provision of adequate balanced feed and clean water.

Vaccination and disease prevention programs.

Proper housing and sanitation.

Regular deworming and tick control.

8. (a) Define:

(i) Digestibility

Digestibility is the proportion of feed that can be broken down and absorbed by the animal's body.

(ii) Feed conversion ratio

Feed conversion ratio is the amount of feed required to produce a unit of animal product such as meat, milk, or eggs.

(iii) Nutrient

A nutrient is a chemical substance in feed that is essential for growth, maintenance, and reproduction.

(iv) Energy value

Energy value is the amount of energy derived from feed when metabolized by the animal.

(b) Mention four functions of water in livestock.

It regulates body temperature.

It aids in digestion and absorption of nutrients.

It transports nutrients and waste products.

It is essential in metabolic reactions.

(c) List four deficiency symptoms of minerals in cattle.

Calcium deficiency causes weak bones and rickets.

Phosphorus deficiency leads to poor growth and infertility.

Iron deficiency results in anemia.

Copper deficiency causes loss of hair pigment and poor wool growth.

(d) Discuss four importance of vitamins in animal body.

They support normal growth and development.

They enhance reproduction and fertility.

They boost immunity and disease resistance.

They play a role in metabolic reactions and energy utilization.

9. (a) Outline the functions of the following reproductive organs of a hen:

(i) Ovary produces ova and secretes hormones.

(ii) Infundibulum receives the ovum and is the site of fertilization.

(iii) Magnum secretes albumen around the yolk.

(iv) Isthmus forms shell membranes around the egg.

(b) State five factors affecting egg production in poultry.

Breed type, nutrition, age of the hen, disease status, and management practices such as lighting.

(c) Suggest five management practices for improving hatchability in poultry farms.

Use of fertile eggs from healthy flocks.

Proper storage and handling of hatching eggs.

Maintaining correct incubation temperature and humidity.

Turning eggs regularly during incubation.

Good hygiene and biosecurity in hatcheries.

10. (a) Mention five desirable characteristics of pasture legumes.

High protein content.

Ability to fix atmospheric nitrogen.

Tolerance to grazing pressure.

Adaptation to local soils and climate.

High palatability to livestock.

(b) Outline five principles of rotational grazing.

Divide pasture into paddocks.

Graze animals in one paddock at a time.

Allow rest periods for grazed paddocks.

Adjust stocking rate according to pasture growth.

Ensure water availability in all paddocks.

(c) Describe three methods of pasture improvement.

Overseeding with improved species.

Fertilizer application to boost growth.

Weed control to reduce competition.

(d) State four advantages of reseeding pastures.

Increases forage yield and quality.

Improves soil fertility through legumes.

Enhances pasture persistence and resilience.

Reduces weed invasion.