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 : 2006**

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) Pest outbreak is a sudden increase in pest population that exceeds the economic threshold level and causes serious crop damage.

   (ii) Pest resistance is the ability of a pest population to withstand a pesticide that was previously effective against it.

   (iii) Pest surveillance is the regular monitoring and observation of pest populations and crop conditions to guide timely control measures.

   (iv) Biological equilibrium is the natural balance between pest populations and their natural enemies in an ecosystem.

   (b) Explain the role of four natural enemies of insect pests in pest management.

   Predators such as ladybird beetles feed on aphids and other soft-bodied insects, reducing their population.

   Parasitoids like wasps lay eggs inside or on pests, and the developing larvae kill the host.

   Pathogens such as fungi, bacteria, and viruses infect and kill insect pests.

   Competitors reduce pest populations by competing with them for food or habitat resources.

   (c) State two disadvantages of biological pest control.

   It is usually slow in reducing pest populations compared to chemical methods.

   It may fail if the natural enemies do not adapt well to the new environment.

2. (a) Briefly explain the following plant breeding concepts:

   (i) Double cross hybrid is obtained by crossing two single-cross hybrids to combine desirable traits from four different inbred lines.

   (ii) Pedigree selection is a method where superior plants are selected from segregating populations and their genealogy is recorded.

   (iii) Genetic engineering involves direct manipulation of genes using biotechnology to produce plants with desirable traits.

   (iv) Clone is a group of plants derived from a single parent plant through vegetative propagation, genetically identical to the parent.

   (v) Mutation is a sudden heritable change in the genetic material that can produce new traits.

   (b) List three advantages of genetic engineering in crops.

   It produces crops resistant to pests and diseases.

It allows faster development of crops with desired traits.

It can improve nutritional quality of food crops.

(c) Explain two limitations of using clones in plant breeding.

They have low genetic diversity, making them vulnerable to pests and diseases.

They may lose vigor over time due to accumulation of mutations.

3. (a) Explain the importance of resistant varieties in controlling plant diseases.

   Resistant varieties lower the cost of disease management by reducing chemical use, provide reliable yields even under disease pressure, and help maintain environmental safety by reducing pesticide pollution.

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

(i) Maize smut

Cause: Ustilago maydis fungus.

Symptoms: Swollen, grayish galls on ears, tassels, and stems filled with dark spores.

Control: Plant resistant maize varieties and practice crop rotation.

(ii) Potato blight

Cause: Phytophthora infestans fungus.

Symptoms: Brownish-black lesions on leaves, white downy growth on undersides, and rotting of tubers.

Control: Apply fungicides, use resistant varieties, and avoid waterlogging.

(iii) Coffee berry disease

Cause: Colletotrichum kahawae fungus.

Symptoms: Dark sunken lesions on green berries that later rot.

Control: Use resistant coffee varieties, prune trees to allow aeration, and spray fungicides.

4. (a) Define:

   (i) Weed seed bank is the reserve of viable weed seeds present in the soil that can germinate over time.

   (ii) Selective herbicides are chemicals that kill certain types of weeds without harming the crop.

   (iii) Pre-emergence herbicides are applied before weed seedlings emerge to inhibit their growth.

(b) (i) Explain three advantages of cultural methods of weed control

They are environmentally friendly since no chemicals are used.

They improve soil fertility through practices like crop rotation.

They reduce weed population sustainably by breaking weed life cycles.

(ii) Mention three limitations of chemical methods of weed control

They are costly for smallholder farmers.

They may pollute soil and water sources.

Overuse can lead to herbicide resistance in weeds.

(c) Describe five general characteristics of weeds.

Weeds produce many seeds for rapid spread.

They have high seed dormancy allowing survival in the soil seed bank.

They are highly adaptable to different environments.

They compete vigorously with crops for nutrients, light, and water.

They regenerate easily through vegetative parts such as rhizomes and stolons.

5. (a) Explain two groups of mycoplasma diseases in crops with examples.

Phytoplasma diseases include lethal yellowing of coconut, transmitted by insect vectors.

Spiroplasma diseases include corn stunt disease, also transmitted by leafhoppers.

(b) Outline:

(i) Three fungal diseases of cereals are rice blast, wheat rust, and maize smut.

(ii) Three viral diseases of tuber crops are cassava mosaic disease, sweet potato feathery mottle virus, and potato leaf roll virus.

(iii) Four bacterial diseases of vegetables are bacterial wilt of tomato, soft rot of cabbage, bacterial leaf spot of pepper, and black rot of cabbage.

(c) Describe the nature, symptoms, and control of cassava bacterial blight.

Nature: A bacterial disease caused by Xanthomonas axonopodis pv. manihotis.

Symptoms: Angular leaf spots with yellow halos, wilting of shoots, and gum exudation from stems.

Control: Plant resistant cassava varieties, use clean planting material, and practice crop rotation.

SECTION B

6. (a) Distinguish between nomadic pastoralism and ranching.

Nomadic pastoralism involves moving livestock from place to place in search of pasture and water, while ranching is a settled system where animals are kept on a fenced area with managed pastures.

(b) Mention six disadvantages of nomadic pastoralism.

It leads to overgrazing and land degradation.

Animals suffer from long treks and poor nutrition.

There is high risk of disease spread due to uncontrolled movement.

Conflicts often occur over grazing land and water.

It hinders access to veterinary and extension services.

It results in low productivity of animals.

(c) List four advantages of ranching system.

It allows better pasture management.

It reduces spread of livestock diseases.

It enables selective breeding for improved productivity.

It supports efficient use of land and resources.

7. (a) Describe four harmful effects of helminths in livestock.

They cause anemia by sucking blood.

They damage the digestive tract leading to poor nutrient absorption.

They reduce weight gain and productivity.

They predispose animals to secondary infections.

(b) Identify three types of worms affecting ruminants and describe briefly one control method for each.

Roundworms cause digestive disturbances; controlled by regular deworming.

Tapeworms cause stunted growth and diarrhea; controlled by pasture management and dewormers.

Liver flukes damage the liver and cause anemia; controlled by draining swampy grazing areas and using flukicides.

(c) Outline:

(i) Three signs of coccidiosis in poultry are bloody diarrhea, drooping wings, and reduced feed intake.

(ii) Two measures for its control are good sanitation and use of anticoccidial drugs.

8. (a) Define:

(i) Digestion is the breakdown of feed into simpler forms that can be absorbed by the body.

(ii) Absorption is the process of nutrients passing through the gut wall into the blood or lymph.

(iii) Catabolism is the breakdown of complex molecules into simpler ones with energy release.

(iv) Anabolism is the building up of complex molecules from simpler ones, requiring energy.

(b) Mention four functions of carbohydrates in farm animals.

They provide energy for body functions.

They act as precursors for fats.

They spare proteins from being used for energy.

They support proper functioning of the nervous system.

(c) State four deficiency symptoms of carbohydrates in animals.

Loss of body weight.

General weakness and fatigue.

Low milk production in dairy animals.

Reduced reproductive performance.

(d) Describe four functions of minerals in animal body.

They form structural components of bones and teeth.

They regulate osmotic balance and body fluids.

They are involved in enzyme activation.

They support reproduction and growth.

9. (a) Describe the following reproductive hormones in cattle:

(i) Follicle stimulating hormone (FSH) stimulates growth of ovarian follicles.

(ii) Luteinizing hormone (LH) triggers ovulation and formation of corpus luteum.

(iii) Progesterone maintains pregnancy by supporting uterine lining.

(iv) Estrogen regulates estrus behavior and prepares the uterus for conception.

(b) Outline six events of the gestation period in cows.

Fertilization of ovum and zygote formation.

Embryo implantation in the uterus.

Differentiation of tissues and organ formation.

Fetal growth and development.

Secretion of progesterone to maintain pregnancy.

Preparation of mammary glands for lactation.

(c) Mention six causes of infertility in cows.

Nutritional deficiencies such as lack of energy or minerals.

Poor heat detection and breeding management.

Infections like brucellosis or leptospirosis.

Hormonal imbalances.

Congenital defects of the reproductive system.

Stress due to poor housing or environmental conditions.

10. (a) Identify five characteristics of a good fodder crop.

    High yield potential.

    Nutritive value rich in proteins and energy.

    Fast growth and high regrowth capacity.

    Tolerance to drought and pests.

    Palatability to livestock.

(b) Suggest five practices of pasture management in dry areas.

Early planting to maximize soil moisture.

Use of drought-tolerant pasture species.

Conservation of fodder as hay or silage.

Controlled stocking to prevent overgrazing.

Supplementary irrigation where possible.

(c) Explain three importance of fodder trees in livestock production.

They provide high-protein feed during dry seasons.

They help conserve soil and improve fertility through nitrogen fixation.

They provide shade and shelter for animals.