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 : 2000**

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 as used in crop protection:

   (i) Economic injury level

   Economic injury level is the lowest pest population density that causes economic damage to the crop, meaning the losses equal or exceed the cost of control.

   (ii) Economic threshold

   Economic threshold is the pest population density at which control measures should be applied to prevent the population from reaching the economic injury level.

   (iii) Pest resurgence

   Pest resurgence is the rapid reappearance of a pest population to damaging levels after it had previously been reduced, often due to pesticide use that killed natural enemies.

   (iv) Host plant resistance

   Host plant resistance is the ability of a crop variety to withstand, tolerate, or reduce pest attack through its genetic makeup.

   (b) Identify four non-insect pests of crops and describe one type of damage caused by each.

   Nematodes cause root galls and stunted growth in crops. Rats and rodents gnaw grains both in the field and in storage leading to losses. Birds feed on seeds and young seedlings reducing crop stand. Mites suck sap from leaves causing discoloration and reduced photosynthesis.

   (c) Suggest four advantages and two disadvantages of using pesticides in pest control.

   Advantages: Pesticides act quickly in reducing pest populations. They are effective over large areas. They ensure high crop yields and better quality produce. They are easy to apply using modern equipment. Disadvantages: They can cause environmental pollution and health hazards. They may also lead to development of pest resistance and destruction of beneficial organisms.

2. (a) Explain briefly the following concepts in crop breeding:

   (i) Cross pollination

   Cross pollination is the transfer of pollen grains from the anther of one flower to the stigma of another flower of the same or different plant species.

   (ii) Self pollination

   Self pollination occurs when pollen grains from the anther of a flower fertilize the stigma of the same flower or another flower on the same plant.

   (iii) Heterosis

   Heterosis or hybrid vigor is the superior performance of hybrid offspring compared to their parents in traits such as yield and disease resistance.

(iv) Mutation breeding

Mutation breeding involves inducing genetic changes in plants using physical or chemical mutagens to develop new traits.

(v) Polyploidy

Polyploidy is the condition of having more than two complete sets of chromosomes in a plant cell, which may result in increased vigor or size.

(b) Mention three objectives of plant breeding.

To increase crop yield, to improve resistance to pests and diseases, and to enhance quality traits such as taste and nutritional value.

(c) Outline four disadvantages of mutation breeding.

It may produce undesirable mutations, the process is unpredictable, it requires specialized facilities and chemicals, and it may take long to identify and stabilize desirable traits.

3. (a) Assess the effectiveness of crop rotation and mixed cropping in controlling crop diseases.

   Crop rotation is effective because it breaks the life cycles of disease pathogens that depend on a single host, reducing disease incidence. Mixed cropping reduces the spread of diseases since the presence of multiple crops in the same field hinders easy transmission of pathogens, but it may not eliminate diseases completely.

(b) Describe the symptoms, causative agent, and control measures of the following plant diseases:

(i) Coffee berry disease

Symptoms include dark sunken lesions on green berries that later rot. The causative agent is Colletotrichum kahawae fungus. Control measures include using resistant varieties, pruning for aeration, and applying fungicides.

(ii) Cassava mosaic disease

Symptoms are mottling, distortion, and stunted growth of cassava leaves. The causative agent is Cassava mosaic virus spread by whiteflies. Control measures include planting resistant varieties, roguing infected plants, and controlling whiteflies.

(iii) Groundnut rosette

Symptoms are yellowing, stunting, and rosetting of groundnut plants. The causative agent is Groundnut rosette virus spread by aphids. Control measures include early planting, resistant varieties, and aphid control.

4. (a) Define the following weed-related terms:

   (i) Noxious weeds

   Noxious weeds are weeds that are legally declared harmful due to their aggressive growth, high competitiveness, or poisonous nature.

   (ii) Allelopathy

   Allelopathy is the chemical inhibition of one plant by another through the release of toxins that affect seed germination or growth.

(b) (i) Briefly explain mechanical methods of weed control.

Mechanical weed control involves physical removal or destruction of weeds using hand tools, machinery, or cultural practices like hoeing, ploughing, slashing, and uprooting.

(ii) Mention three advantages and three disadvantages of mechanical weed control.

Advantages are that it is environmentally friendly, cheap where labour is available, and improves soil aeration when combined with tillage. Disadvantages are that it is time consuming, not suitable for large farms, and may damage crops if done carelessly.

(c) Describe four chemical properties used in classifying herbicides.

Herbicides are classified based on their mode of action such as contact or systemic. They are also classified by selectivity as selective or non-selective. They can be grouped by time of application as pre-emergence or post-emergence. Finally, they may be grouped by chemical family such as triazines or phenoxy compounds.

5. (a) Explain two groups of parasitic bacteria giving one example in each.

   Obligate parasites can only survive and multiply in living host tissue, for example Xanthomonas oryzae causing bacterial leaf blight of rice. Facultative parasites can live both as saprophytes and parasites, for example Pseudomonas syringae affecting many plants.

(b) Outline:

(i) Four ways in which viruses spread in plants

Viruses spread through insect vectors like aphids, through vegetative propagation materials, through mechanical injury by tools, and via seeds or pollen.

(ii) Four signs of nitrogen deficiency in plants

Yellowing of leaves especially older ones, stunted growth, poor tillering in cereals, and low yields.

(iii) Three common fungal diseases in cereals

Rusts, smuts, and blights.

(c) Give a detailed description of rice yellow mottle disease in terms of symptoms, spread, and control.
Symptoms include mottling, yellowing, and stunted growth of rice plants with poor grain filling. It spreads through infected seed, insect vectors like beetles, and contaminated water. Control measures include using resistant varieties, planting clean seed, crop rotation, and vector control.

6. (a) Differentiate between intensive and extensive livestock production systems.
   Intensive systems involve keeping large numbers of livestock in confined areas with high input management like zero grazing. Extensive systems involve animals grazing freely over large areas with minimal inputs.

   (b) Explain six benefits of intensive system of livestock production.
   It allows efficient land use, enables close monitoring of animals, ensures high production per unit area, reduces disease transmission from wild animals, improves breeding management, and increases manure collection for use in crops.

   (c) State four limitations of extensive livestock production.
   It requires large land areas, exposes animals to diseases and predators, leads to overgrazing and land degradation, and results in low productivity per unit area.

7. (a) Describe four effects of internal parasites on livestock production.
   They cause weight loss and poor growth, reduce milk and meat production, weaken immunity making animals prone to diseases, and may cause death in severe infestations.

   (b) Mention four common tick species and the type of disease each transmits.
   Rhipicephalus appendiculatus transmits East Coast fever. Boophilus decoloratus transmits anaplasmosis. Amblyomma variegatum transmits heartwater. Hyalomma species transmit babesiosis.

   (c) (i) State five general signs of worm infestation in cattle.
   Diarrhoea, pot-belly, anaemia, poor appetite, and rough hair coat.
   (ii) Suggest three control measures of worm infestation.
   Rotational grazing, regular deworming, and maintaining pasture hygiene.

8. (a) Define the following terms in animal nutrition:
   (i) Concentrates
   Concentrates are feeds rich in nutrients like energy or protein but low in fiber, such as maize or oil

cakes.

(ii) Maintenance ration

Maintenance ration is the amount of feed given to an animal to maintain its basic body functions without gain or loss of weight.

(iii) Production ration

Production ration is the feed supplied to animals in addition to maintenance needs to support production such as milk, meat, or eggs.

(iv) Supplementary feed

Supplementary feed is additional feed provided to improve the nutritional balance of the main ration.

(b) Explain four functions of proteins in animal nutrition.

Proteins build and repair body tissues, form enzymes and hormones, support growth and reproduction, and help in disease resistance by forming antibodies.

(c) Outline six deficiency symptoms of protein in farm animals.

Stunted growth, poor reproduction, loss of appetite, rough hair coat, reduced milk production, and increased susceptibility to diseases.

(d) Describe three functions of carbohydrates in animal body.

Carbohydrates provide energy for body functions, help in fat deposition, and maintain body temperature through metabolism.

9. (a) Briefly explain the function of the following parts of a cow's reproductive system:

(i) Ovary

The ovary produces ova and secretes hormones like estrogen and progesterone.

(ii) Oviduct

The oviduct transports ova and is the site of fertilization.

(iii) Uterus

The uterus provides the environment for implantation and development of the fetus.

(iv) Cervix

The cervix acts as a gateway between the uterus and vagina, producing mucus and protecting against infections.

(b) Explain the process of fertilization and implantation in cattle.

During fertilization, sperm deposited in the female tract travel to the oviduct where they fuse with the

ovum to form a zygote. The zygote undergoes cell division and moves to the uterus where it attaches to the uterine wall, a process called implantation, allowing embryo development.

(c) State six signs of heat in a cow.
Restlessness, mounting other cows, clear mucus discharge from the vulva, bellowing, swollen vulva, and reduced milk yield.

10. (a) Outline five characteristics of a good pasture grass species.
    It should be palatable, high yielding, resistant to drought, persistent under grazing, and able to regenerate quickly.

(b) Mention five common legume species used in pasture improvement.
Desmodium, Stylosanthes, Lucerne, Clover, and Centrosema.

(c) Suggest five measures for conserving fodder during dry season.
Making hay, silage production, storing crop residues, growing drought tolerant fodder, and practicing deferred grazing.

(d) Explain five benefits of rotational grazing.
It allows pasture recovery, improves forage utilization, reduces spread of diseases and parasites, enhances soil fertility from evenly spread manure, and increases carrying capacity of pasture.