THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL OF TANZANIA

ADVANCED CRTIFICATE OF SECONDARY EDUCATION EXAMINATION

134/2 **AGRICULTURE 2**

(For Both School and Private Candidates)

Time: 3 Hours. **ANSWER** **Year: 2021**

Instructions

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

1. Briefly describe five adaptive features of the pest (grasshopper) in relation to its mode of feeding.

One adaptive feature of the grasshopper is its strong mandibles, which are designed for biting and chewing tough plant material such as leaves and stems. This allows it to break down fibrous tissues effectively.

Another feature is the presence of sharp maxillae with cutting edges, which assist in tearing plant tissues into smaller pieces that can be swallowed easily.

The labrum, which acts as an upper lip, helps to hold the plant material firmly in place during chewing, preventing food from slipping away.

The labium, which functions as the lower lip, provides support and guides food into the mouthparts, aiding in efficient feeding.

Finally, the palps found on the maxillae and labium act as sensory organs that help the grasshopper detect and choose suitable food materials before chewing, ensuring selective feeding.

2. (a) Explain how to identify the disease in the field.

In the field, potato diseases such as late blight can be identified by observing characteristic symptoms on leaves, stems, and tubers. Leaves may show irregular brown or black spots with pale yellow margins, often starting at the leaf tips or edges.

Infected stems can develop dark lesions that spread quickly, causing wilting and collapse of the plant.

On the tubers, the disease manifests as dark, sunken patches with granular rot inside when cut open.

(b) Briefly explain how the disease is spread in potatoes.

The disease is spread by fungal spores (sporangia) carried by wind, rain splash, or irrigation water from infected plants to healthy ones.

It can also spread through infected seed tubers, where the fungus is already present and introduces the disease at planting.

Additionally, contaminated soil and crop residues left in the field act as sources of infection for the next planting season.

(c) Account on seven control measures of the disease in the field.

Farmers should practice crop rotation by avoiding planting potatoes or related crops like tomatoes in the same field for consecutive seasons to reduce pathogen buildup.

They should use certified disease-free seed tubers to prevent introduction of infection into the field.

Rogueing, or removal of infected plants, should be done early to reduce the spread of the pathogen.

Application of appropriate fungicides such as copper-based chemicals can control the disease when applied at early stages of infection.

Farmers should adopt resistant potato varieties that can tolerate or resist late blight infection.

Proper field sanitation, such as removing and destroying crop residues, is important to reduce sources of infection.

Good spacing of potato plants should be maintained to ensure proper aeration, which reduces moisture that favors disease development.

3. (a) Propose five cultural practices for controlling bacterial wilt diseases in the tropics.

One cultural practice is crop rotation with non-susceptible crops such as cereals, which reduces the buildup of bacterial wilt pathogens in the soil.

Farmers should use resistant or tolerant crop varieties that are less likely to succumb to bacterial wilt infection.

Proper field hygiene should be maintained by removing and destroying infected plants to prevent further spread of the disease.

Use of clean planting materials that are free from bacterial contamination helps to avoid introducing the pathogen into the field.

Controlling insect vectors such as beetles, which transmit bacteria, is also a key practice in reducing the spread of bacterial wilt.

(b) Examine five environmental conditions necessary for growth and development of pathogenic fungi in plants.

High humidity favors the germination of fungal spores and their penetration into plant tissues, making it a critical condition for infection.

Warm temperatures within the range of 20°C to 30°C enhance fungal growth and reproduction, accelerating disease spread.

Poorly drained soils with excessive moisture create a favorable environment for fungal survival and infection.

Shaded conditions reduce evaporation of moisture and maintain leaf wetness for longer periods, which allows fungal spores to develop.

Presence of susceptible host plants provides the necessary nutrients and tissues for fungal colonization and multiplication.

4. Analyse five good cultural practices that can be used to control weeds.

Practicing crop rotation disrupts the life cycle of weeds, as different crops compete differently and suppress specific weed species.

Timely weeding using hand hoes or mechanical cultivation reduces weed competition with crops at critical stages of growth.

Maintaining proper plant spacing ensures crop canopy cover that shades out weeds, minimizing their growth.

Use of mulching with crop residues or plastic sheets prevents light from reaching weed seeds, thereby suppressing their germination.

Early land preparation before planting helps to expose and destroy weed seeds and seedlings, giving crops a better start.

5. Analyse four breeding methods to be used in self-pollinated crop species for successful crop improvement.

One method is mass selection, where seeds from the best-performing plants are selected and grown to improve desirable traits over generations.

Another method is pure line selection, in which a single superior plant is chosen and its progeny are propagated until a uniform line with stable traits is achieved.

Hybridization can also be used by crossing two self-pollinated lines to combine favorable traits such as high yield and disease resistance.

Mutation breeding, involving exposure of seeds to radiation or chemicals to induce useful genetic variation, is another method for improving self-pollinated crops.

6. Briefly explain five limitations experienced by farmers when practising organic farming.

One limitation is low yields compared to conventional farming, as organic farming avoids synthetic fertilizers and pesticides that enhance productivity.

Another challenge is high labor demand, since organic farming requires manual weed control, compost preparation, and regular monitoring.

Pest and disease control becomes difficult in organic systems because of the prohibition of synthetic chemicals, leading to possible crop losses.

Organic inputs such as compost, green manure, and biopesticides are not always readily available, which limits farmers' ability to practice organic farming.

Market challenges also arise, as organic products may not always fetch higher prices or access stable markets in developing countries.

7. Describe the structure of five secondary reproductive organs in the cow and give the function of each.

The oviducts are narrow tubes that connect the ovaries to the uterus. Their function is to transport ova and provide the site for fertilization.

The uterus is a muscular organ consisting of two uterine horns and a body. Its function is to provide a site for embryo implantation and fetal development.

The cervix is a thick-walled structure located between the uterus and the vagina. It serves to protect the uterus from infection and allows passage of sperm and calf during birth.

The vagina is a muscular canal that connects the cervix to the vulva. It functions as the site of semen deposition during mating and as the birth canal.

The vulva is the external opening of the reproductive tract. Its function is to allow passage of urine, estrous fluids, and the calf during parturition.

SECTION B (30 Marks)

8. (a) Give six significance of water as a feed component in animal body.

Water is important for regulating body temperature through processes like sweating and respiration.

It is a medium for transportation of nutrients, hormones, and waste products within the body.

Water plays a role in maintaining cell turgidity, which is essential for normal body functions.

It is a solvent in which biochemical reactions take place, supporting metabolism and digestion.

Water is necessary for the production of milk in lactating animals, which contains a high proportion of water.

It helps in lubricating joints and organs, ensuring smooth movement and protection of internal tissues.

(b) Examine four factors that govern the amount of water intake in animals.

One factor is the type of feed, as dry feeds such as hay increase water requirements, while fresh feeds like green forage reduce the need for drinking water.

Environmental temperature also governs intake, with hotter conditions leading to increased water consumption.

The level of production affects intake, as lactating or fast-growing animals require more water to support their higher metabolic demands.

Animal size and species determine water needs, with larger animals or high-yielding dairy cows requiring more water than smaller livestock.

9. Explain procedures to be followed by livestock keepers in establishing their own pastures.

The first procedure is site selection, where farmers choose suitable land with good soil fertility, drainage, and accessibility for pasture establishment.

The second step is land preparation, which involves clearing bushes, plowing, and harrowing to make the soil fine and suitable for seed germination.

Next is seed selection, where livestock keepers choose appropriate grass and legume species that suit the local climate and livestock needs.

Seed sowing should then be done either by broadcasting or drilling at the right depth and time to ensure good germination.

After sowing, farmers should practice weed control and apply fertilizers or manure to boost pasture growth.

Fencing the pasture is also important to prevent uncontrolled grazing and to facilitate rotational grazing.

Finally, proper grazing management should be implemented, where animals are allowed to graze only after the pasture has established well to avoid damage.

10. (a) Account for six management practices that can be taken to control parasites (roundworms) from infecting the animal.

Regular deworming using appropriate anthelmintic drugs helps to kill roundworms and reduce their population in animals.

Rotational grazing reduces the chance of animals picking up worm larvae from contaminated pastures.

Proper sanitation, including cleaning of animal housing and removal of manure, reduces the breeding grounds for parasites.

Avoiding overstocking prevents high contamination levels of worm eggs in grazing areas.

Providing adequate nutrition strengthens animals' immunity, helping them to resist worm infestations.

Quarantining new animals before mixing them with the main herd helps to prevent introducing worm infections.

(b) Give eight points on how to identify an animal with high infestation of round worms.

An animal with high infestation shows weight loss despite feeding normally due to nutrient depletion by worms.

It develops diarrhea, often with mucus or blood, as worms damage the intestinal lining.

The animal appears weak and lethargic, spending much time lying down instead of grazing.

Pale mucous membranes in the eyes and gums are noticeable, indicating anemia caused by blood-sucking worms.

The animal may exhibit pot-bellied appearance, especially in young ones, due to accumulation of fluids in the abdomen.

Rough and dull hair coat is another sign, as worms interfere with nutrient absorption.

Reduced milk yield in dairy animals is observed, caused by stress and nutrient loss.

Finally, some animals may cough persistently when roundworms affect the respiratory tract.