THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

134/1 SCIENCE AND PRACTICE OF AGRICULTURE 1

(For Both School and Private Candidates)

Time: 2:30 Hours **ANSWERS** **Year: 2008**

Instructions

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

SECTION A

AGRICULTURAL ENGINEERING AND LAND PLANNING

1. (a) Describe the construction of a wheelbarrow.

   A wheelbarrow is constructed as a simple manually operated transport tool designed to carry loads over short distances on the farm. It consists of a strong metal or wooden tray where materials are placed, and this tray is shaped to hold loose or solid materials securely.

   At the front of the wheelbarrow, a single wheel is fitted to support most of the load and allow easy movement. The wheel is mounted on an axle fixed to the frame, enabling smooth rolling when the wheelbarrow is pushed.

   Two handles extend from the rear of the tray and are used by the operator to lift, balance, and push the wheelbarrow. These handles also help in controlling direction and speed during movement.

   The frame connects the tray, wheel, and handles together, providing strength and stability so that the wheelbarrow can carry heavy loads without breaking.

1. (b) Explain four uses of a wheelbarrow on the farm.

   A wheelbarrow is used to transport harvested crops from the field to storage or collection points, reducing manual carrying and saving labour.

   It is used to carry farm inputs such as manure, fertilizers, seeds, and animal feeds from stores to the field or livestock units.

   A wheelbarrow is used to move tools and equipment around the farm, especially during land preparation, planting, and construction activities.

It is also used to remove waste materials such as weeds, stones, and debris from fields and farm compounds, helping to maintain cleanliness and organization.

2. (a) Explain the meaning of farm layout.

   Farm layout is the planned arrangement of farm enterprises, buildings, roads, fields, and other facilities within a farm. It aims at ensuring efficient use of land, labour, and other resources.

2. (b) Describe four components of a good farm layout.

   Farm buildings such as houses, stores, and animal shelters are included to provide proper accommodation and storage while minimizing unnecessary movement.

   Farm roads and paths are included to allow easy movement of people, machinery, and produce between different parts of the farm.

   Fields and plots are arranged in a way that supports efficient crop production and easy management practices such as irrigation and harvesting.

   Water sources such as wells, dams, or tanks are positioned strategically to supply water for irrigation, livestock, and domestic use.

3. (a) Distinguish between renewable and non-renewable farm power sources.

   Renewable farm power sources are sources of energy that can be naturally replaced or replenished over time without being exhausted.

   Non-renewable farm power sources are sources of energy that exist in limited quantities and cannot be replaced once they are used up.

3. (b) Give two examples of each.

   Examples of renewable farm power sources include animal power and solar energy.

Examples of non-renewable farm power sources include diesel fuel and petrol.

3. (c) State one advantage of renewable farm power.

   Renewable farm power is environmentally friendly because it does not produce harmful emissions or cause long-term environmental pollution.

4. (a) Explain the purpose of fencing on farms.

   Fencing is used on farms to protect crops from damage by animals and unauthorized persons.

   It is also used to control and manage livestock movement, ensuring animals remain within designated grazing or housing areas.

4. (b) Describe two types of farm fencing.

   Permanent fencing is constructed using durable materials such as wire, posts, and concrete and is intended for long-term use.

   Temporary fencing is made using lighter materials and is used for short-term purposes such as rotational grazing or seasonal crop protection.

4. (c) State two materials used in fencing.

   Wooden posts are commonly used to support fencing structures.

   Barbed wire or plain wire is used to form the barrier that restricts movement.

5. (a) A farmer harvested 3,600 kg of maize from 1.5 hectares.

   (i) Calculate yield per hectare.

Yield per hectare = Total yield ÷ Area

Yield per hectare = 3,600 ÷ 1.5

Yield per hectare = 2,400 kg per hectare

(ii) State two factors that may influence maize yield.

Soil fertility influences maize yield because adequate nutrients are required for healthy plant growth and grain formation.

Rainfall or water availability affects maize yield since insufficient or excessive moisture can reduce crop performance.

SECTION B

SOIL SCIENCE

6. (a) Define soil depth.

Soil depth refers to the vertical thickness of soil from the surface down to the parent material or bedrock where plant roots can penetrate and grow.

6. (b) Explain four factors that influence soil depth.

Parent material influences soil depth because soft and easily weathered rocks form deeper soils than hard rocks.

Climate affects soil depth since high rainfall and temperature increase weathering rates, leading to deeper soils.

Topography influences soil depth because soils on steep slopes are often shallow due to erosion, while soils in valleys are deeper due to deposition.

Time affects soil depth because soils become deeper as weathering and soil formation processes continue over long periods.

7. (a) Explain soil compaction.

   Soil compaction is the process by which soil particles are pressed closely together, reducing pore spaces and limiting air and water movement in the soil.

7. (b) Describe three causes of soil compaction.

   Use of heavy machinery on wet soils causes soil particles to be compressed tightly together.

   Repeated trampling by livestock, especially in grazing areas, leads to compaction of the soil surface.

   Continuous cultivation at the same depth creates a hard pan that restricts root penetration.

7. (c) State two effects of soil compaction on crops.

   Soil compaction restricts root growth, limiting access to nutrients and water.

   It reduces water infiltration and drainage, leading to poor crop growth and lower yields.

8. (a) Define mulching.

   Mulching is the practice of covering the soil surface with plant residues or other materials to conserve moisture and improve soil conditions.

8. (b) Explain four advantages of mulching in crop production.

   Mulching reduces moisture loss from the soil by minimizing evaporation.

   It suppresses weed growth by blocking sunlight from reaching weed seeds.

Mulching helps regulate soil temperature, creating a favorable environment for root growth.

It improves soil fertility as organic mulches decompose and add nutrients to the soil.

SECTION C
RURAL ECONOMY

9. (a) Explain the meaning of production economics.

Production economics is the branch of economics that studies how farmers combine resources to produce agricultural goods efficiently and profitably.

9. (b) Describe four factors of production in agriculture.

Land refers to natural resources such as soil, water, and climate used in agricultural production.

Labour includes human physical and mental effort used in farming activities.

Capital consists of man-made resources such as tools, machinery, and buildings used in production.

Management involves decision-making and coordination of resources to achieve farm objectives.

9. (c) A farmer uses land, labour, capital, and management. Explain how each factor contributes to farm output.

Land provides the physical space and natural conditions necessary for crop and livestock production.

Labour performs the activities required to operate the farm, including planting, weeding, and harvesting.

Capital improves efficiency and productivity by providing tools, machinery, and infrastructure.

Management ensures proper planning, organization, and control of farm operations to maximize output.

10.(a) Explain the meaning of break-even analysis.

Break-even analysis is a financial tool used to determine the level of production or sales at which total costs are equal to total revenue, resulting in no profit or loss.

10.(b) A farmer produces tomatoes at a total cost of Tshs 1,200,000. Each crate sells at Tshs 30,000.

(i) Calculate the number of crates needed to break even.

Break-even quantity = Total cost ÷ Selling price per crate
Break-even quantity = 1,200,000 ÷ 30,000
Break-even quantity = 40 crates

(ii) If 60 crates are sold, calculate profit or loss.

Total revenue = 60 × 30,000
Total revenue = Tshs 1,800,000

Profit = Total revenue − Total cost
Profit = 1,800,000 − 1,200,000 = Tshs 600,000
(c) State two uses of break-even analysis in farm planning.

Break-even analysis helps farmers determine the minimum production level required to avoid losses.

It assists in making decisions on pricing, production scale, and investment planning.