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: 2009**

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) Explain the advantages of drip irrigation over furrow irrigation.

   Drip irrigation supplies water directly to the root zone of crops in small, controlled amounts, which greatly reduces water wastage through evaporation and runoff compared to furrow irrigation.

   It improves water use efficiency and allows crops to receive moisture uniformly, leading to better growth and higher yields.

   Drip irrigation also minimizes weed growth because only the crop root area is wetted, unlike furrow irrigation where large soil surfaces are exposed to moisture.

1. (b) (i) Name the components of a drip irrigation system.

   The main components of a drip irrigation system include a water source, main pipeline, lateral pipes, emitters, filters, and pressure regulators.

1. (b) (ii) Describe the function of emitters.

   Emitters regulate and release water slowly from the lateral pipes directly to the plant root zone.

   They ensure uniform water application and prevent damage to crops from excess water pressure.

2. (a) A seed drill has 8 planting tubes spaced 25 centimetres apart. Calculate the total width of the drill in metres.

   Spacing between tubes = 25 cm = 0.25 m

Total width = number of spaces × spacing

Total width = 8 × 0.25

Total width = 2.0 metres

2. (b) If the drill travels at 4 kilometres per hour, calculate the area covered in one hour.

   Area covered = width × distance traveled

   Distance traveled in 1 hour = 4 km = 4,000 m

   Area covered = 2.0 × 4,000

   Area covered = 8,000 square metres

   Since 1 hectare = 10,000 square metres, the area covered is 0.8 hectares per hour.

3. (a) Name the common plumbing fittings used to join pipes of different diameters.

   Common plumbing fittings include reducers, couplings, unions, and adapters.

3. (b) (i) Describe the use of a gate valve.

   A gate valve is used to control the flow of water in a pipeline by fully opening or fully closing the passage.

   It is commonly installed in main supply lines where flow needs to be completely stopped or allowed.

3. (b) (ii) Explain how to fix a leaking pipe joint.

   A leaking pipe joint is fixed by first shutting off the water supply and drying the joint.

   The joint is then dismantled, cleaned, resealed using appropriate sealing material such as tape or cement, and reconnected tightly.

4. (a) List four types of errors that occur during surveying.

The four types of errors in surveying are instrumental errors, personal errors, natural errors, and gross errors.

4. (b) (i) Define a systematic error.

   A systematic error is an error that occurs repeatedly in the same direction due to faulty instruments or consistent observation mistakes.

4. (b) (ii) Give one example of a gross error.

   An example of a gross error is recording a wrong measurement due to carelessness or misreading the measuring tape.

5. (a) Describe the materials used for roofing farm buildings.

   Materials used for roofing farm buildings include galvanized iron sheets, aluminum sheets, thatch, and tiles.

   These materials are chosen based on durability, cost, and ability to protect the building from weather conditions.

5. (b) (i) State the advantages of galvanized iron sheets.

   Galvanized iron sheets are durable and resistant to rust, making them suitable for long-term use.

   They are also easy to install and require minimal maintenance.

5. (b) (ii) Discuss the importance of a high roof in tropical animal housing.

   A high roof allows hot air to rise and escape, reducing heat stress on animals.

   It improves ventilation and creates a cooler environment suitable for animal health and productivity.

SECTION B

SOIL SCIENCE

6. (a) State the causes of soil acidity.

   Soil acidity is caused by excessive rainfall that leaches basic nutrients such as calcium and magnesium.

   Continuous use of acidic fertilizers also contributes to soil acidity.

   Decomposition of organic matter releases acids that lower soil pH.

6. (b) (i) Name three liming materials.

   Liming materials include agricultural lime, dolomitic lime, and burnt lime.

6. (b) (ii) Explain how lime reduces soil acidity.

   Lime neutralizes excess hydrogen ions in the soil, raising the soil pH.

   It also supplies calcium and magnesium, which replace acidic ions on soil particles.

7. (a) Distinguish between macronutrients and micronutrients.

   Macronutrients are nutrients required by plants in large amounts for growth and development.

   Micronutrients are nutrients needed in very small quantities but are still essential for plant functions.

7. (b) (i) Give three examples of micronutrients.

   Examples of micronutrients include iron, zinc, and copper.

7. (b) (ii) Describe the deficiency symptoms of iron in plants.

Iron deficiency causes yellowing of young leaves while veins remain green.

Severe deficiency leads to stunted growth and poor plant development.

8. (a) Explain the importance of soil moisture conservation.

Soil moisture conservation ensures continuous availability of water to crops during dry periods.

It improves crop yield and reduces the risk of crop failure due to drought.

8. (b) (i) Describe the practice of mulching.

Mulching involves covering the soil surface with organic or inorganic materials to reduce evaporation.

It also suppresses weeds and improves soil structure over time.

8. (b) (ii) Explain how zero tillage helps in conserving soil moisture.

Zero tillage leaves crop residues on the soil surface, reducing evaporation losses.

It also improves water infiltration and reduces soil disturbance.

SECTION C
RURAL ECONOMY

9. (a) Define market equilibrium.

Market equilibrium is the situation where quantity demanded equals quantity supplied at a particular price.

9. (b) (i) Explain what happens when there is a surplus in the market.

When supply exceeds demand, sellers lower prices to clear excess goods.

This leads to an increase in quantity demanded and a reduction in supply.

9. (b) (ii) Explain what happens when there is a shortage in the market.

When demand exceeds supply, prices rise as buyers compete for limited goods.

This encourages producers to increase supply.

9. (c) Use a supply and demand schedule to show how equilibrium price is reached.

At different prices, quantities demanded and supplied change until they become equal.

The price at which quantity demanded equals quantity supplied is the equilibrium price.

9. (d) Discuss the factors that cause the supply curve of maize to shift to the right.

Improved farming technology increases maize production.

Favorable weather conditions and reduced input costs also increase supply.

10. (a) Define the law of comparative advantage in international trade.

The law of comparative advantage states that countries should specialize in producing goods they can produce at a lower opportunity cost.

10. (b) (i) Explain why countries trade agricultural products.

Countries trade to access products they cannot produce efficiently.

Trade allows specialization and efficient resource use.

10. (b) (ii) Define a tariff.

A tariff is a tax imposed on imported goods to protect domestic producers.

10.(c) Country X can produce either 50 units of coffee or 20 units of tea, while Country Y can produce either 30 units of coffee or 30 units of tea. Calculate the opportunity cost of producing coffee for each country.

For Country X, opportunity cost of 1 unit of coffee = 20 ÷ 50 = 0.4 units of tea.

For Country Y, opportunity cost of 1 unit of coffee = 30 ÷ 30 = 1 unit of tea.

10.(d) Based on your calculations, state which country has a comparative advantage in coffee production.

Country X has a comparative advantage in coffee production because it sacrifices less tea per unit of coffee produced.