THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL OF TANZANIA

ADVANCED CRTIFICATE OF SECONDARY EDUCATION EXAMINATION

134/1 **AGRICULTURE 1**

(For Both School and Private Candidates)

Time: 3 Hours. **ANSWER** **Year: 2023**

Instructions

1. This paper consists of sections A, B and C.
2. Answer **all** questions in sections A and **two (2)** questions from each of section B and C.
3. Section A carries **40** marks, section B and section C carries 30 marks each.
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. Explain the five factors that cause variation of soil during its formation.

The parent material is one factor that causes variation in soils. Different rocks produce soils with different textures, mineral compositions, and fertility levels. For example, basalt produces fertile clay soils while granite produces sandy soils.

Climate is another factor that influences soil formation. Rainfall and temperature affect the rate of weathering, leaching, and organic matter decomposition, which results in variations in soil depth, structure, and fertility.

Topography also influences soil variation. Soils on slopes are often shallow and prone to erosion, while soils on flat land or valleys are deeper and more fertile due to deposition of materials.

Living organisms, including plants, animals, and microorganisms, contribute to soil variation. They add organic matter, influence soil structure, and alter nutrient content through biological activities.

Time is another factor, as soils change and develop different horizons over long periods. Young soils differ in structure and fertility compared to older, more developed soils.

2. (a) Distinguish the gravitational water from the field capacity.
   Gravitational water is the excess water that drains freely through large soil pores immediately after rainfall or irrigation. It is not available to plants because it moves quickly beyond the root zone.
   Field capacity is the amount of water retained in soil after excess gravitational water has drained away. It is available to plants for use in growth and development.

(b) Argue for the statement, “soil air is inevitable” for proper growth of plants.
Soil air is inevitable because plant roots need oxygen for respiration, which provides energy for growth and nutrient uptake.
It is also necessary for soil microorganisms that decompose organic matter and recycle nutrients for plant use.
Soil air helps in maintaining proper root health by preventing anaerobic conditions that can cause diseases.
It regulates the balance of carbon dioxide and oxygen in the soil, ensuring favorable conditions for root metabolism.

Without soil air, waterlogged conditions develop, which hinder root functions and reduce crop productivity.

3. (a) Give four qualities of cowpea plant that make it a good cover crop.

   Cowpea has rapid growth, which allows it to quickly cover the soil and suppress weeds.

   It is a leguminous plant, capable of fixing nitrogen in the soil, thus improving soil fertility.

   Cowpea has dense foliage that protects the soil from erosion by wind and water.

   It is drought-tolerant, making it reliable in dry areas as a cover crop.

(b) (i) Briefly explain two short-term advantages of the practice of burning the vegetation.
Burning quickly clears land of weeds, shrubs, and residues, making it easy for immediate cultivation.
It temporarily increases soil fertility by releasing mineral nutrients such as phosphorus and potassium from the ash.

(ii) Account for four long-term disadvantages of the practice of burning the vegetation.
Burning destroys organic matter, reducing the soil's ability to retain moisture and nutrients.
It kills beneficial soil organisms that aid in decomposition and nutrient recycling.
It exposes the soil surface to erosion since protective cover is lost.
Continuous burning leads to soil structure deterioration and long-term decline in fertility.

4. Explain seven beneficial effects of using the correct amount of lime in the management of acid soil and three detrimental effects of excessive application of lime.

The correct amount of lime neutralizes soil acidity, creating a favorable pH for crop growth.
It increases the availability of essential nutrients like phosphorus and molybdenum.
It reduces the toxicity of harmful elements such as aluminum and manganese in acidic soils.
It improves soil structure by promoting aggregation and aeration.
It encourages microbial activity that decomposes organic matter and releases nutrients.
It enhances root development by creating a favorable environment for root expansion.
It increases the effectiveness of fertilizers applied to the soil.

Excessive lime can reduce the availability of micronutrients such as iron, zinc, and manganese, leading to deficiencies.

It may cause soil pH to become too alkaline, which negatively affects crop growth.
Over-liming can alter soil structure negatively by reducing the balance of essential cations like potassium and magnesium.

5. (a) Give six conditions in which the use of the tractor will be more successful than the animal power.
   Tractors are more successful on large farms where vast land areas require cultivation.
   They are effective in areas where soils are heavy and require strong power for tillage.
   Tractors are reliable in regions where timeliness of operations is crucial, such as during short planting seasons.
   They are better suited for commercial farms where efficiency and high output are needed.
   Tractors can perform a wide range of operations such as ploughing, harrowing, planting, and harvesting.
   They are more effective in areas with good infrastructure, where fuel, spare parts, and repair services are available.

   (b) Give four points on how the ignition system of the tractor engine can be maintained.

   The spark plugs should be cleaned or replaced regularly to ensure consistent ignition.

   The battery should be checked and kept fully charged to provide reliable current.

   The ignition coil and distributor should be inspected and serviced to maintain strong voltage supply.

   The wiring system should be checked frequently to ensure proper connections and prevent short circuits.

6. (a) Propose five factors to be considered to construct an efficient, durable and low-cost electric wire fence to control the movement of farm animals.

   The choice of fence posts is a very important factor. Posts should be made from durable materials such as treated timber or metal that can withstand weathering and resist rotting. Strong posts ensure the wires remain tightly stretched and the fence lasts long.

   The spacing of posts must also be considered. Posts that are placed too far apart will allow wires to sag, reducing the effectiveness of the fence. Proper spacing keeps the wires firm and prevents animals from pushing through or breaking the fence.

The type and quality of wire used determine the strength and durability of the fence. Galvanized wires are the most suitable because they resist rusting and conduct electricity efficiently, ensuring that animals receive effective shocks when they touch the fence.

The power source for the fence should be reliable. Farmers can choose solar energy or mains electricity, but whichever is chosen must provide consistent power to keep the fence charged at all times. Without a steady power supply, animals may test and break through the fence.

Proper earthing of the fence is essential. An electric fence works by completing a circuit through the animal and the ground, so strong earth rods and good soil contact are necessary to make the shocks effective. Poor earthing will make the fence ineffective regardless of the quality of posts and wires used.

(b) Propose five maintenance requirements of planes as a workshop tool.

The blade of the plane should be sharpened frequently. A sharp blade ensures smooth and efficient cutting, reduces the effort required by the user, and produces a neat finish on wood surfaces.

The body of the plane must be cleaned after every use. Dust, moisture, and wood particles should be removed to prevent rusting and damage to both the metallic and wooden parts of the tool.

The adjusting screws and other movable parts should be oiled regularly. Oiling prevents rusting, keeps the tool parts moving smoothly, and makes adjustments easier during use.

When not in use, the blade of the plane should be retracted into the body. This prevents accidents and also protects the blade from being damaged when the tool is stored.

The plane should always be stored in a dry and safe place. Keeping it away from moisture reduces the chances of rusting and warping of wooden handles, ensuring the tool lasts longer and performs efficiently.

7. (a) Elaborate the four necessary adjustments to be done on the tractor mounted mouldboard plough because of not creating suitable tilth during the cultivation.

The horizontal alignment of the plough should be corrected. If the plough is not level, one side of the furrow will be deeper than the other, leading to uneven soil tilth. Aligning it horizontally ensures uniform depth across the field.

The vertical alignment should be checked. A tilted plough will not penetrate properly, and the furrows will not be turned correctly. Adjusting it vertically ensures the ploughshare cuts the soil straight down and lifts it effectively.

The ploughing depth must be adjusted. If the plough is set too shallow, weeds and residues will not be buried properly, while excessive depth wastes fuel and creates large clods. Proper depth ensures a fine tilth and good seedbed preparation.

The condition of the ploughshare should be examined. A blunt or worn-out share cannot cut soil efficiently, leading to rough clods instead of fine tilth. Sharpening or replacing the ploughshare restores its efficiency and improves soil preparation.

(b) Justify the statement that the "drip irrigation system is said to minimise certain crop diseases outbreak and weed growth than the sprinkler irrigation system."

Drip irrigation applies water directly to the root zone of crops, leaving the leaves dry. This minimizes fungal diseases such as mildew and blight, which spread quickly in moist leaf environments caused by sprinkler irrigation.

It also reduces bacterial diseases, because excess moisture on stems and leaves provides conditions for bacteria to thrive. By keeping the upper plant parts dry, drip irrigation reduces the chance of infections.

Drip irrigation limits weed growth since only the crop root zone is watered. Unlike sprinkler irrigation that wets the whole field, drip irrigation denies weeds the moisture they need to germinate and grow.

Drip irrigation also minimizes soil splash, which is a common way soil-borne pathogens are transferred to crops during sprinkler irrigation. By reducing splash, drip irrigation keeps crops healthier and reduces the spread of diseases.

8. (a) Summarize the seven roles of an entrepreneur as a farm manager.

An entrepreneur organizes farm resources such as land, labor, and capital. This ensures that inputs are efficiently allocated to different enterprises, avoiding waste and maximizing output.

The entrepreneur makes key decisions on which crops or livestock to keep. This decision-making role determines whether the farm chooses enterprises that match market demand and environmental suitability.

The entrepreneur assumes risks in farming. These include price fluctuations, droughts, pests, and diseases. By bearing these risks, the entrepreneur keeps the farm functioning despite uncertainties.

The entrepreneur introduces innovations into the farm. This may involve adopting new technologies, improved seeds, or better farming methods to increase production and profitability.

They coordinate all farm activities, ensuring that tasks such as planting, weeding, and harvesting are done on time and in the correct order.

They supervise workers to make sure that instructions are followed and resources are not wasted. This ensures efficiency and accountability in the farm.

They manage farm finances, keeping records of income and expenditure. Financial management enables planning, evaluating performance, and reinvesting profits for future growth.

(b) Elaborate three types of the labour used in the production process.

Family labour consists of work provided by members of the farmer's household. It is usually unpaid, flexible, and important for small farms where labor costs must be minimized.

Hired labour involves workers employed from outside the household. They are paid wages or salaries and are often used for specific tasks such as ploughing, weeding, or harvesting.

Exchange labour is when farmers assist one another, especially during peak seasons. It is based on mutual cooperation rather than cash payment, allowing tasks to be completed quickly without hiring costs.

9. (a) Account for eight situations in the market indicating the existence of imperfect competition.

The presence of monopolies, where a single seller dominates the supply of a product, is one situation that shows imperfect competition.

Oligopoly, where a few firms dominate the market and influence prices collectively, also represents imperfect competition.

Product differentiation, where sellers market their products as unique despite similarities, reduces uniformity and creates imperfect competition.

Price discrimination, where identical products are sold to different customers at different prices, is another sign of imperfect competition.

High barriers to entry, such as the need for large capital investments, prevent new competitors from joining the market freely.

Collusion among sellers, where they agree to fix prices or restrict output, undermines free competition.

Heavy advertising to create artificial demand is also a feature of imperfect competition, as it manipulates consumer choice.

Government restrictions such as licensing requirements and quotas also reduce free competition, contributing to imperfect market conditions.

(b) Differentiate between the collusive oligopoly and the non-collusive oligopoly.

In a collusive oligopoly, firms cooperate with one another by setting prices or limiting output. This reduces competition and stabilizes the market, often resulting in higher prices for consumers.

In a non-collusive oligopoly, firms act independently and compete aggressively. This competition can lead to price wars, unstable markets, and rapid changes in supply and demand.

10. (a) Propose four measures to be taken by the government to reduce the effect of low world market prices for its cash crops as a result of global challenges.

The government can promote local processing industries so that cash crops are exported as finished goods rather than raw materials. This increases value and provides higher returns to farmers.

It can diversify export markets by finding alternative countries or regions for selling cash crops, reducing reliance on a small number of buyers.

It can provide subsidies or financial assistance to farmers during periods of low prices. This helps farmers continue production without suffering huge losses.

It can also encourage local consumption of cash crops by promoting industries and products that use them, creating a steady internal market that cushions farmers from global price drops.

(b) Propose four important questions that have to be answered by the farmer before replacing the tomato enterprise with the fish farming enterprise.

The farmer must ask whether they have access to the necessary resources such as water bodies, ponds, or capital for establishing fish farming.

The farmer should ask whether there is reliable demand and strong markets for fish compared to tomatoes, to ensure that the new enterprise is profitable.

The farmer must ask whether they have the technical knowledge and management skills for fish farming, or whether training and extension support are available.

The farmer should ask whether fish farming will be more sustainable and less risky compared to tomato production in terms of costs, income, and long-term benefits.