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: 2006**

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 meaning of irrigation.

   Irrigation is the artificial application of water to agricultural land in order to supplement rainfall and provide crops with adequate moisture for growth. It ensures continuous crop production even during periods of low or unreliable rainfall.

1. (b) Describe two methods of surface irrigation.

   Basin irrigation is a method where water is applied to level plots of land surrounded by bunds. The water spreads evenly over the basin and infiltrates the soil, making this method suitable for crops such as rice.

   Furrow irrigation involves applying water through small channels made between crop rows. The water flows along the furrows and slowly infiltrates into the soil, supplying moisture to plant roots.

1. (c) State two limitations of surface irrigation.

   Surface irrigation often leads to wastage of water through runoff and deep percolation, reducing water use efficiency.

   It can also cause soil erosion and uneven water distribution, especially on sloping or poorly levelled land.

2. (a) Describe the construction of an ox-plough.

   An ox-plough is constructed with a strong wooden or metal beam that connects the plough to the yoke used to harness oxen. This beam transmits pulling force from the animals to the plough.

The plough has a metal share fixed at the front bottom, which cuts into the soil during ploughing. A mouldboard is attached behind the share to lift and turn the soil.

A handle is fitted at the rear to allow the operator to guide and control the plough direction and depth during operation.

2. (b) Explain how animal power is harnessed in ploughing.

   Animal power is harnessed using a yoke that fits over the necks or shoulders of the oxen. The yoke is connected to the plough beam using chains or ropes.

   When the animals move forward, the pulling force generated is transferred through the yoke and beam to the plough, enabling the share to penetrate and turn the soil.

2. (c) State two advantages of animal traction.

   Animal traction is cheaper to acquire and maintain compared to tractors, making it suitable for small-scale farmers.

   It is also environmentally friendly since it does not rely on fossil fuels and causes less soil compaction.

3. (a) Explain the purpose of drainage in agriculture.

   Drainage is used to remove excess water from the soil surface or root zone in order to prevent waterlogging. Proper drainage creates favourable soil conditions for root growth and crop development.

3. (b) Describe two types of farm drainage systems.

   Surface drainage involves the removal of excess water from the soil surface using open ditches or channels. This method is effective in areas with heavy rainfall.

Subsurface drainage uses underground pipes or tiles to remove excess water from the root zone. It helps maintain optimal soil moisture levels for crops.

3. (c) State two effects of poor drainage on crops.

   Poor drainage reduces oxygen availability in the soil, leading to poor root respiration and stunted growth.

   It also increases the risk of root diseases and nutrient leaching, resulting in reduced crop yields.

4. (a) Define farm workshop.

   A farm workshop is a building or designated area on a farm where tools, machinery, and equipment are repaired, serviced, and maintained.

4. (b) Describe four uses of a farm workshop.

   A farm workshop is used for repairing and maintaining farm machinery to ensure efficient operation.

   It is used for storing farm tools and equipment safely when not in use.

   The workshop provides a place for fabricating simple farm implements and structures.

   It is also used for sharpening tools and carrying out routine servicing activities.

4. (c) State two safety rules observed in farm workshops.

   Protective clothing such as gloves and goggles should be worn to prevent injuries.

   Tools and equipment should be properly stored after use to avoid accidents.

5. (a) A water pump discharges 1,200 litres per hour.

   (i) Calculate the amount of water pumped in 6 hours.

Amount of water pumped = 1,200 × 6

Amount of water pumped = 7,200 litres

(ii) Convert the answer into cubic metres.

1 cubic metre = 1,000 litres

Water pumped = 7,200 ÷ 1,000

Water pumped = 7.2 cubic metres

5. (b) State two uses of water pumps on farms.

Water pumps are used to supply irrigation water to crops during dry periods.

They are also used to provide water for livestock and domestic farm use.

SECTION B

SOIL SCIENCE

6. (a) Define soil salinity.

Soil salinity is the accumulation of excessive soluble salts in the soil, which interferes with normal plant growth and water uptake.

6. (b) Explain three causes of soil salinity.

Irrigation with saline water introduces salts into the soil, which accumulate over time if not properly leached.

Poor drainage causes salts to build up in the root zone due to limited leaching.

High evaporation rates in arid areas leave salts behind on the soil surface as water evaporates.

6. (c) State two effects of soil salinity on crops.

Soil salinity reduces the ability of plants to absorb water, leading to wilting and poor growth.

It can also cause toxicity of specific ions, resulting in reduced yields or crop failure.

7. (a) Explain the term nutrient deficiency.

   Nutrient deficiency is a condition in which plants lack one or more essential nutrients required for normal growth and development.

7. (b) Describe deficiency symptoms of nitrogen and phosphorus in crops.

   Nitrogen deficiency causes yellowing of older leaves, poor vegetative growth, and reduced yield.

   Phosphorus deficiency leads to stunted growth, dark green or purplish leaves, and delayed maturity.

8. (a) Define soil microorganisms.

   Soil microorganisms are microscopic living organisms found in the soil, including bacteria, fungi, algae, and protozoa.

8. (b) Explain four roles of soil microorganisms in agriculture.

   Soil microorganisms decompose organic matter, releasing nutrients for plant uptake.

   They fix atmospheric nitrogen into forms usable by plants.

   Microorganisms improve soil structure by producing binding substances that form aggregates.

   They help in suppressing soil-borne diseases by competing with harmful organisms.

SECTION C

RURAL ECONOMY

9. (a) Explain the meaning of enterprise budgeting.

Enterprise budgeting is a planning tool used to estimate the costs, returns, and profitability of a specific farm enterprise.

9. (b) A poultry farmer incurred the following costs per cycle.

Chicks Tshs 600,000
Feeds Tshs 1,800,000
Vaccines Tshs 200,000
Labour Tshs 400,000
Sales amounted to Tshs 3,600,000

(i) Calculate total cost.

Total cost = 600,000 + 1,800,000 + 200,000 + 400,000
Total cost = Tshs 3,000,000

(ii) Calculate net profit.

Net profit = Total sales − Total cost
Net profit = 3,600,000 − 3,000,000
Net profit = Tshs 600,000

(iii) Calculate profit per bird if 1,200 birds were sold.

Profit per bird = 600,000 ÷ 1,200
Profit per bird = Tshs 500

9. (c) State two uses of enterprise budgets.

Enterprise budgets help farmers compare profitability of different enterprises.

They assist in planning and controlling farm expenditures and investments.

10.(a) Explain the meaning of market information.

Market information refers to data about prices, demand, supply, and market conditions that guide farmers in marketing decisions.

10.(b) Describe four sources of market information.

Local markets provide direct information on current prices and demand.

Radio and television broadcasts share market trends and price updates.

Agricultural extension officers provide advisory and market-related information.

Mobile phones and internet platforms offer real-time market data.

10.(c) Explain four benefits of market information to farmers.

Market information helps farmers sell produce at better prices.

It assists farmers in choosing profitable crops and markets.

Farmers can plan production based on expected demand.

It reduces exploitation by middlemen.

10.(d) State two problems associated with unreliable market information.

Unreliable information leads to poor pricing decisions and losses.

It causes poor planning and misallocation of farm resources.