

AGRIC SCIENCE (TYPE E)

14

PAPER II

Answer **five** questions only, **one** from each section.

SECTION A

- 1a. Explain **two** ways through which the following factors determine the location of animal housing unit in a farm: (2 marks)
(i) Hygiene (2 marks)
(ii) Drainage
- b. Give **four** farm tools that are used mainly for post planting operation in citrus plantation. (4 marks)
- c. Mention **two** objectives of the following non-governmental organisations in Nigeria:
(i) International Institute of-Tropical Agriculture (IITA) (2 marks)
(ii) International Livestock Centre for Agriculture (ILCA) (2 marks)
- d. List **four** factors that causes shortage of fresh food supply in the urban areas of Nigeria. (4 marks)
- 2a. (i) Differentiate between shifting cultivation and bush fallowing in Agriculture. (2 marks)
(ii) Give **two** ways by which leasehold system of land tenure impedes agricultural production. (2 marks)
- b. Enumerate four agricultural research institute that specialises in processing animals produce. (4 marks)
- c. Outline **four** precautions that should be observed when using electrical power in the farm. (4 marks)
- d. A Fadama land surveyed to be triangular in shape has AB 1,000m and BC 2,000m was proposed for establishing banana plantation in the spacing of 400cm × 400cm. How many suckers will be needed to plant the Fadama land? (4 marks)

SECTION B

- 3a. State **four** advantages of organic matter to soil. (4 marks)
- b. Mention **three** reasons for the preference of loamy soil to other soil types in the cultivation of stem tuber crops. (3 marks)
- c. Copy and complete the table below.

S/N	Original rock	Metamorphic rocks
i	sandstone	
ii		slate
iii	shale	

- d. Give **two** major effects noise pollution in the farm. (3 marks)
- e. List **two** demerits of the following farming practices on soil: (2 marks)
- (i) Total tillage (2 marks)
- (ii) Fertilizer application
- 4a. Mention **one** organic manure that supplies the following nutrients in an orchard: (1 mark)
- (i) Calcium (1 mark)
- (ii) Nitrogen (1 mark)
- (iii) Phosphorus (2 marks)
- b. State **two** advantages of drip irrigation over sprinkler. (3 marks)
- c. Give **three** effects of low pH on the growth of crops. (3 marks)
- d. Explain **two** ways by which the following factors affect agricultural production: (2 marks)
- (i) Soil types (2 marks)
- (ii) Soil organisms
- e. The following data were recorded during a laboratory experiment to determine the moisture content of a soil sample:
- Mass of evaporatory dish = 2.5g
- Mass of evaporatory dish and fresh soil sample = 5.3g
- Mass of evaporatory dish and dried soil sample = 4.0g
- Calculate the percentage of water by mass of the soil sample. (4 marks)

SECTION C

- 5a. (i) Define silviculture. (2marks)
 (ii) Differentiate between alley cropping and taungya farming. (2marks)
- b. Briefly explain onion twister disease under the following headings: (1 mark)
 (i) Mode of transmission (2 marks)
 (ii) Two symptoms (1 mark)
 (iii) One control measure
- c. Itemize two morphological features that are similar to the following pairs of pasture crops: (2 marks)
 (i) Guinea grass and elephant grass (2 marks)
 (ii) Tropical kudzu and sunhemp (4 marks)
- d. List four reasons farmers prefer mixed cropping to the mono-cropping. (4 marks)
- 6a. Discuss the production of garden egg under the following headings (1 mark)
 (i) Land preparation (1 mark)
 (ii) Method of propagation (2 marks)
 (iii) Two major pests
- b. Give four reasons for the difficulty encountered by farmers in eliminating weeds from crop farms. (4 marks)
- c. Mention four ornamental trees that provide shades in school premises. (4 marks)
- d. Illustrate with diagram, the F1 and F2 monohybrid inheritance of Mendel's law with a recessive homozygous cotton plant (qq) and dominant homozygous represented with (QQ). (4 marks)

SECTION D

- 7a. Outline **three** processes that must take place within the lung of a farm animal during exhalation. (3 marks)
- b. State **one** reason each for the following regulations in fish harvesting along the central areas of Nigeria:
- (i) Ban on electro fishing (1 mark)
 - (ii) Allocation of fishing area (1 mark)
 - (iii) Catch quota (1 mark)
 - (iv) Close season (1 mark)
- c. Enumerate **three** demerits of nomadic farming in Nigeria. (3 marks)
- d. (i) State **two** benefits of fostering offspring in animal management. (2 marks)
- (ii) Differentiate between steaming up and fattening up in animal management. (2 marks)
- e. Give **two** important precautions that should be observed by apiarist when harvesting honey from a hive. (2 marks)
- 8a. (i) Define the term paddocking in rangeland management. (2 marks)
- (ii) Name **two** types of grazing that should be adopted in an established rangeland. (2 marks)
- b. With the aid of diagram, represent the life cycle of a liverfluke. (4 marks)
- c. (i) State **two** phenotypic features that should be considered as a basis for selecting a boar from a herd for breeding purposes. (2 marks)
- (ii) Differentiate between inbreeding and linebreeding in animal improvement. (2 marks)
- d. State **four** reasons colostrum is important to a new born calf. (4 marks)

SECTION E

- 9a. Mamman poultry farm secured ₦5,000,000 loan from International Development Agency at the rate of 5% per annum to be repaid in full at the end of 10 years.
- (i) Classify the loan given to the farm based on the length of period and source of the loan. (2 marks)
 - (ii) Calculate the total amount, the farm manager will repay to the Agency at the end of 10 years. (2 marks)
 - (iii) Enumerate three possible challenges the farm manager would have experienced before securing the loan. (3 marks)
- b. Give two importance of keeping a profit and loss account. (2 marks)
- c. State four problems of extension service that is caused by farmers in agricultural production. (4 marks)
- d. State three ways of encouraging farmers to adopt innovations for bumper agricultural production. (3 marks)
- 10a. (i) Define the term "premium" in agricultural insurance. (2 marks)
- (ii) List two major problems of agricultural insurance that discourages commercial farmers. (2 marks)
- b. Enumerate four functions of a farm manager. (4 marks)
- c. State two advantages of the following mass media methods of information dissemination in agriculture:
- (i) Television (2 marks)
 - (ii) Online services (2 marks)
- d. List four contributions of research institutes to the success of agricultural extension services in Nigeria. (4 marks)

(i) Hygiene: The animal house should be located on a clean, dry and well-ventilated site to reduce the spread of diseases and parasites. Proper hygiene also makes cleaning and waste disposal easier, thereby promoting healthy livestock.

(ii) Drainage: The site should have good drainage to prevent waterlogging and flooding. Good drainage keeps the animal house dry, reduces offensive odours, and minimizes disease outbreaks caused by damp conditions.

(1b)

(i) Secateurs

(ii) Pruning knife

(iii) Hedge shears

(iv) Knapsack sprayer

(1ci)

International Institute of Tropical Agriculture (IITA):

(i) To develop and improve high-yielding, disease-resistant crop varieties.

(ii) To promote improved farming technologies that increase food production and farmers' income.

(1cii)

International Livestock Centre for Agriculture (ILCA):

(i) To improve the productivity and health of livestock through research.

(ii) To develop better livestock management and feeding systems for increased animal production.

(1d)

(i) Rapid urban population growth leading to high food demand.

(ii) Poor transportation network from rural farms to urban markets.

(iii) Inadequate storage and preservation facilities resulting in post-harvest losses.

(iv) Seasonal shortage of agricultural produce due to weather and climate.

(2ai)

Shifting cultivation involves farmers moving from one piece of land to another after cultivating for a few years, while bush fallowing involves leaving the same piece of land uncultivated for some years to regain its fertility before returning to cultivate it again.

(2aii)

(i) Short lease periods discourage farmers from making permanent improvements on the land.

(ii) Payment of annual rent increases the cost of agricultural production.

(2b)

(i) Nigerian Institute for Oceanography and Marine Research (NIOMR)

(ii) National Veterinary Research Institute (NVRI), Vom

- (iii) Nigerian Institute for Trypanosomiasis Research (NITR)
- (iv) National Animal Production Research Institute (NAPRI), Zaria

(2c)

- (i) Avoid touching electrical equipment with wet hands.
- (ii) Ensure electrical cables are properly insulated.
- (iii) Switch off power before repairing electrical equipment.
- (iv) Do not overload electrical sockets or extension cables.

(2d)

Given: AB = 1,000 m, BC = 2,000 m

Area of triangular land = $\frac{1}{2} \times 1000 \times 2000 = 1,000,000 \text{ m}^2$

Spacing: $400 \text{ cm} \times 400 \text{ cm} = 4 \text{ m} \times 4 \text{ m}$

Area per sucker = $4 \times 4 = 16 \text{ m}^2$

Number of suckers = $1,000,000 \div 16 = 62,500$ banana suckers

(3a)

- (i) Improves soil fertility by supplying nutrients.
- (ii) Enhances soil structure and aggregation.
- (iii) Increases the water-holding capacity of the soil.
- (iv) Encourages the activities of beneficial soil microorganisms.

(3b)

- (i) It has good water-holding capacity.
- (ii) It is well aerated and allows easy root penetration.
- (iii) It is rich in plant nutrients and organic matter.

(3c)

[TABULATE PLEASE]

Under Original Rock

- (i) Sandstone
- (ii) Shale
- (iii) Shale

Under Metamorphic Rock

- (i) Quartzite
- (ii) Slate
- (iii) Schist

(3d)

- (i) Noise causes stress and fear in farm animals, reducing productivity.

(ii) It distracts farm workers and may lead to accidents during farm operations.

(3ei)

Total tillage:

(i) Exposes the soil to erosion by wind and water.

(ii) Destroys soil structure and beneficial soil organisms.

(3eii)

Fertilizer application:

(i) Excessive application may increase soil acidity.

(ii) Overuse can cause nutrient imbalance and environmental pollution.

(4a)

(i) Calcium: Bone meal

(ii) Nitrogen: Poultry manure

(iii) Phosphorus: Bone meal

(4b)

(i) Drip irrigation conserves more water by supplying it directly to the root zone, while sprinkler irrigation loses more water through evaporation and wind drift.

(ii) Drip irrigation reduces weed growth because only the crop root area is watered, while sprinkler irrigation wets the entire field, encouraging weed growth.

(4c)

(i) Low pH reduces the availability of essential plant nutrients.

(ii) It increases the toxicity of certain minerals such as aluminium and manganese, thereby inhibiting crop growth.

(iii) It results in poor root development, stunted growth and low crop yield.

(4d)

(i) Soil types: Different soil types affect agricultural production because fertile soils such as loamy soil support better crop growth and higher yields, while infertile soils such as sandy soils require more inputs before they can produce good harvests.

(ii) Soil organisms: Soil organisms improve agricultural production by decomposing organic matter and releasing nutrients for plant use. They also improve soil structure and aeration, thereby promoting healthy crop growth.

(4e)

Mass of evaporating dish = 2.5 g

Mass of dish + fresh soil = 5.3 g → Fresh soil = 2.8 g

Mass of dish + dry soil = 4.0 g → Dry soil = 1.5 g

Mass of water = 2.8 – 1.5 = 1.3 g

Percentage water = $(1.3 \div 2.8) \times 100 = 46.4\%$

(5a)

(i) Silviculture is the branch of forestry that deals with the establishment, cultivation, management, protection and harvesting of forest trees for economic and environmental purposes.

(ii) Alley cropping is a farming system where food crops are grown between rows of trees or shrubs, while taungya farming is a system where food crops are grown together with young forest trees only during the early stage of forest establishment until the trees mature.

(5b)

(i) Mode of transmission: The disease is mainly transmitted through infected planting materials, contaminated farm tools and insect vectors.

(ii) Two symptoms: Twisting and curling of leaves; yellowing, stunted growth and poor bulb formation.

(iii) Control measure: Use disease-free planting materials and destroy infected plants.

(5c)

(i) Guinea grass and Elephant grass: Both have long, narrow leaves; both possess fibrous root systems.

(ii) Tropical kudzu and Sunhemp: Both are leguminous pasture crops; both have broad leaves and root nodules for nitrogen fixation.

(5d)

(i) It reduces the spread of pests and diseases.

(ii) It makes better use of available land, water and nutrients.

(iii) It reduces the risk of total crop failure.

(iv) It improves soil fertility, especially when legumes are included.

(6a)

(i) Land preparation: Land should be cleared, ploughed, harrowed and ridged to provide a fine seedbed.

(ii) Method of propagation: Garden egg is propagated by seeds raised first in a nursery before transplanting.

(iii) Two major pests: Aphids; fruit borers.

(6b)

(i) Some weeds produce numerous seeds.

(ii) Many weeds spread through underground stems such as rhizomes and tubers.

(iii) Weed seeds remain viable in the soil for many years.

(iv) Some weeds grow rapidly and compete vigorously with crops.

(6c)

- (i) Neem (*Azadirachta indica*)
- (ii) Flame tree (*Delonix regia*)
- (iii) Rain tree (*Samanea saman*)
- (iv) Almond tree (*Terminalia catappa*)

(6d)

P₁ Generation: QQ × qq

Gametes: Q, Q × q, q

F₁ Generation: All Qq (dominant)

F₁ Selfing: Qq × Qq

Q × Q → QQ

Q × q → Qq

q × Q → Qq

q × q → qq

Genotypic ratio: 1 QQ : 2 Qq : 1 qq

Phenotypic ratio: 3 Dominant : 1 Recessive

(7a)

- (i) The diaphragm relaxes and moves upward, reducing the volume of the chest cavity.
- (ii) The ribs and intercostal muscles relax, causing the rib cage to move inward and downward.
- (iii) Air is forced out of the lungs through the respiratory tract due to increased pressure inside the lungs.

(7b)

- (i) Ban on electro fishing: Prevents destruction of young and mature fish and protects aquatic organisms from extinction.
- (ii) Allocation of fishing area: Prevents overcrowding of fishing grounds and ensures proper management of fish resources.
- (iii) Catch quota: Controls the quantity of fish harvested to prevent overfishing.
- (iv) Close season: Allows fish to reproduce and replenish their population.

(7c)

- (i) It encourages conflicts between farmers and herders due to competition for grazing land and water.
- (ii) It causes environmental degradation through overgrazing and destruction of vegetation.
- (iii) It makes disease control difficult because animals move from one location to another.

(7d)

(i) Benefits of fostering offspring: Reduces death rate of young animals by providing proper care and nutrition; improves growth and survival of weak or orphaned offspring.

(ii) Steaming up vs fattening up: Steaming up is giving pregnant animals extra nutritious feed before and after parturition to improve the health of mother and offspring, while fattening up is feeding animals high-energy diets to increase body weight and improve meat production.

(7e)

(i) The apiarist should wear protective clothing such as gloves, veil and overall to prevent bee stings.

(ii) Smoke should be used to calm the bees before removing honey from the hive.

(8a)

(i) Paddocking: The division of grazing land into smaller enclosed units called paddocks to allow controlled and rotational grazing of livestock.

(ii) Types of grazing: Rotational grazing; zero grazing.

(8b)

Life cycle of liver fluke:

Adult liver fluke lives in the bile duct of the infected animal → Eggs are passed out through the faeces into water → Eggs hatch into miracidia which infect snails (intermediate host) → Inside the snail, they develop into cercariae → Cercariae leave the snail and attach to grasses as metacercariae → Animals eat contaminated grasses → Larvae migrate to the liver and develop into adult liver flukes.

(8c)

(i) Phenotypic features for selecting a boar: Good body size and strong muscular development; healthy reproductive organs and good general appearance.

(ii) Inbreeding vs linebreeding: Inbreeding is the mating of closely related animals within the same breed to maintain desirable traits, while linebreeding is a controlled form of inbreeding where animals are mated to maintain the characteristics of a particular superior ancestor.

(8d)

(i) It provides antibodies that protect the calf against diseases.

(ii) It supplies essential nutrients needed for early growth and development.

(iii) It helps strengthen the immune system of the newborn calf.

(iv) It acts as a mild laxative that helps remove the first faeces (meconium).

(9a)

(i) Classification of loan: Long-term loan (repayable after 10 years); institutional loan (obtained from an international development agency).

(ii) Total repayment:

$$I = \text{PRT}/100 = (5,000,000 \times 5 \times 10)/100 = \text{N}2,500,000$$

$$\text{Total} = \text{N}5,000,000 + \text{N}2,500,000 = \text{N}7,500,000$$

(iii) Challenges before securing the loan: Difficulty meeting loan requirements/conditions; lack of collateral security; delay in loan approval and disbursement.

(9b)

(i) It helps the farmer determine whether the farm is making profit or loss.

(ii) It assists in proper planning, budgeting and decision-making.

(9c)

(i) Farmers may be unwilling to accept new ideas and innovations.

(ii) Poor educational background of farmers may limit understanding of extension messages.

(iii) Lack of cooperation between farmers and extension workers.

(iv) Limited financial resources may prevent farmers from adopting recommended technologies.

(9d)

(i) Provide practical demonstrations to show farmers the benefits of innovations.

(ii) Offer training and education on improved farming techniques.

(iii) Provide farmers with necessary inputs and support for adoption.

(10a)

(i) Premium: The amount of money paid regularly by an insured farmer to an insurance company to obtain protection against agricultural risks and losses.

(ii) Problems of agricultural insurance: High cost of insurance premiums; delay in compensation after losses occur.

(10b)

Functions of a farm manager:

(i) Planning farm activities and setting production objectives.

(ii) Organising and supervising farm labour and resources.

(iii) Keeping proper farm records and accounts.

(iv) Making decisions on production, marketing and use of farm resources.

(10c)

(i) Television: Reaches a large number of farmers at the same time; uses pictures and demonstrations which make agricultural messages easier to understand.

(ii) Online services: Provides quick access to current agricultural information and innovations; allows farmers to communicate with experts and other farmers easily.

(10d)

(i) They develop improved farming technologies and production methods.

- (ii) They train extension workers on new agricultural innovations.
 - (iii) They provide research findings and information for farmers.
 - (iv) They assist in solving agricultural problems through scientific research.
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