THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

034/1 **AGRICULTURE SCIENCE 1**

(For Both School and Private Candidates)

Time: 3 Hours **ANSWERS** **Year: 2020**

Instructions

1. This paper consists of sections A, B and C with a total of **eleven (11)** questions.

2. Answer **all** questions in sections A and B and **one (1)** question from section C.

3. Sections A and C carry **fifteen (15)** marks each and section B carries **seventy (70)** marks.

4. Cellular phones and any unauthorised materials are **not** allowed in the examination room.

5. Write your **Examination Number** on every page of your answer booklet(s).

1. For each of the items (i) - (x), choose the correct answer among the given alternatives and write its letter beside the item number in the answer booklet provided.

(i) Which device will you use when transmitting power from the oxen to the ox-equipment?
A. Beam
B. Skey
C. Harness
D. Trap
E. U-bolt

Answer: C. Harness
Reason: A harness is specifically designed to transmit power from the oxen to the equipment being used, ensuring efficient transfer of energy for agricultural tasks.

(ii) Which tractor engine part belongs to the reciprocating parts?
(1) Engine block
(2) Crank case
(3) Piston
(4) Connecting rods
(5) Flywheel
A. (1) and (2)
B. (2) and (3)
C. (3) and (5)
D. (3) and (4)
E. (4) and (5)

Answer: D. (3) and (4)
Reason: The piston and connecting rods are reciprocating parts of a tractor engine as they move back and forth to convert energy from the combustion process into mechanical motion.

(iii) Why should a system of shifting cultivation be discouraged?
A. It is not possible to use oxen and tractor.
B. It needs complicated knowledge on farming.
C. There is high incidences of pest and diseases.
D. It involves clearing of land by cutting trees.
E. It incurs very high cost in production.

Answer: D. It involves clearing of land by cutting trees.
Reason: Shifting cultivation often leads to deforestation and environmental degradation as large areas of forest are cleared, disrupting ecosystems and contributing to soil erosion.

(iv) Which disease is characterized by greenish diarrhea from a chicken?
A. New Castle disease

B. Fowl plague
C. Avian Leucosis
D. Infectious coryza
E. Coccidiosis

Answer: E. Coccidiosis
Reason: Coccidiosis is a parasitic disease in poultry caused by protozoa, which commonly leads to greenish diarrhea as one of its symptoms.

(v) An ideal soil which is composed of approximately 40% sand, 40% silt, and 20% clay can be termed as:
A. Loam
B. Sand
C. Silt
D. Clay
E. Sand-silt

Answer: A. Loam
Reason: Loam is considered an ideal soil type because its balanced composition of sand, silt, and clay provides optimal drainage, aeration, and nutrient retention for plant growth.

(vi) Which parasites can be controlled by drenching?
A. Ticks and fleas
B. Tsetse flies and mites
C. Houseflies and lice
D. Ringworm and ascaries
E. Tapeworms and liver flukes

Answer: E. Tapeworms and liver flukes
Reason: Tapeworms and liver flukes are internal parasites that can be effectively controlled using oral drenching methods, which deliver anthelmintic drugs directly to the digestive system.

(vii) Which method can be used to control Blossom End Rot in tomato plants?
(1) Avoiding application of excessive quantity of nitrogenous fertilizers.
(2) Spraying tomato plants with mancozeb starting from seedlings emergence.
(3) Using resistant varieties or tolerant varieties.
(4) Regular watering of the plants.
(5) Using certified seeds and crop rotation.
A. (1) and (4)
B. (2) and (5)
C. (1) and (3)
D. (3) and (4)
E. (4) and (5)

Answer: A. (1) and (4)
Reason: Blossom End Rot is caused by calcium deficiency and water stress. Avoiding excessive nitrogen fertilizers and ensuring regular watering help maintain proper nutrient balance and prevent water-related issues.

(viii) What is the name given to a market type in which a single seller controls the whole market?
A. Pure competition
B. Oligopoly
C. Monopoly
D. Black market
E. Monopsony

Answer: C. Monopoly
Reason: In a monopoly, a single seller dominates the market, controlling prices and supply due to the absence of competitors.

(ix) Pollution can be reduced and controlled to make water or land safe by recycling. What other material can be recycled?
A. Fiber material like sisal bags
B. Plastic materials like plastic bags, plastic bottles, plastic chairs and plastic baskets
C. Cotton material like used piece of clothes
D. Kitchen wastes
E. Crop residues from the farm

Answer: B. Plastic materials like plastic bags, plastic bottles, plastic chairs and plastic baskets
Reason: Recycling plastic materials reduces environmental pollution by minimizing the accumulation of non-biodegradable waste in landfills and water bodies.

(x) Carefully study the data given in the table and answer the questions that follow:

Which type of elastic supply curve can be drawn from the given supply schedule?
A. Perfectly elastic supply curve
B. Perfectly inelastic supply curve
C. Elastic supply curve
D. Inelastic supply curve
E. Unitary elastic supply curve

Answer: B. Perfectly inelastic supply curve
Reason: The quantity supplied remains constant at 100 kg regardless of changes in price, indicating a perfectly inelastic supply where price has no effect on supply levels.

2. Match the functions of surveying instruments in List A with the names of the instruments in List B.

List A
(i) An instrument used to mark temporary stations when surveying.
(ii) An instrument used to align survey lines on the ground.
(iii) An instrument used to indicate a vertical position of a point.
(iv) An instrument used together with level to measure the vertical distances above the reference place.
(v) An instrument used to uphold levels.

List B
A. Plumb bob
B. Odometer
C. Arrow
D. Tripod level
E. Ranging pole
F. Abney level
G. Leveling staff

Answer:
i. Arrow
Used to mark positions during surveying for temporary reference, especially while chaining or measuring distances.

ii. Ranging pole
Used to align survey lines by serving as a visible marker that ensures accuracy in measurements.

iii. Plumb bob
Helps to indicate the vertical alignment or position of a point by ensuring precision in leveling activities.

iv. Leveling staff
Used together with leveling instruments to measure vertical distances above the reference plane.

v. Tripod level
Holds the leveling device securely in place to maintain stability during surveying operations.

3. (a) State five objectives of land survey.

i. To determine land boundaries.
Helps establish the legal ownership and ensures clarity in land use to prevent disputes.

ii. To assess land topography.
Provides detailed information on land features like slopes, elevations, and depressions, useful for construction and agriculture.

iii. To determine land suitability.
Evaluates the potential of land for various activities such as farming, construction, or conservation.

iv. To facilitate planning and development.
Offers essential data for zoning, infrastructure development, and urban planning.

v. To resolve land disputes.
Accurate surveys are crucial for resolving conflicts over land ownership or boundaries.

(b) Briefly explain the function of any five instruments used in chaining/taping.

i. Chain or tape
Measures horizontal distances on the ground accurately and is crucial for land measurement.

ii. Arrows
Used to mark the end of measurements or specific points during chaining, ensuring continuity and accuracy.

iii. Pegs
Inserted into the ground to define starting or ending points for measurements during surveying.

iv. Ranging rods
Align and maintain a straight line during chaining, aiding in accuracy and efficiency.

v. Plumb bob
Ensures vertical alignment while measuring sloped areas, helping to achieve precise results.

4. (a) Briefly explain the behavior of chicks in the brooder house under different temperature conditions.

i. Too hot
Chicks move away from the heat source, pant, spread their wings, and become less active due to discomfort.

ii. Too cold
Chicks huddle near the heat source, chirp loudly, and exhibit signs of distress in an attempt to stay warm.

iii. Air droughts
Chicks avoid areas with direct airflow and may appear stressed, reducing their activity levels.

iv. Right temperature
Chicks are evenly distributed in the brooder, active, feeding normally, and displaying optimal growth behavior.

(b) Why is it advantageous to keep poultry using a free-range system?

i. Reduces feed costs
Poultry forages for food like insects and grasses, which decreases reliance on commercial feeds.

ii. Promotes natural behavior
Allows birds to exhibit natural habits such as scratching, dust bathing, and foraging, improving their overall well-being.

iii. Improves egg quality
Free-range eggs are often nutritionally superior due to the varied diet of the birds.

iv. Reduces disease risks
Open environments lower the risk of diseases associated with overcrowding in confined spaces.

v. Enhances sustainability
Utilizes natural resources efficiently, reducing the need for intensive agricultural inputs.

vi. Provides better welfare for birds
Gives poultry the freedom to roam and access fresh air, sunlight, and diverse diets.

5. (a) Describe five ways on how agricultural wastes and human activities contribute to water pollution.

i. Use of agricultural chemicals
Excess fertilizers and pesticides leach into water sources, contaminating them with harmful substances.

ii. Runoff of livestock waste
Animal manure washed into water bodies leads to increased nutrients, causing eutrophication.

iii. Soil erosion
Sediments from agricultural lands wash into water sources, reducing water quality and increasing turbidity.

iv. Industrial waste discharges
Factories release untreated chemicals into rivers, polluting them with toxic substances.

v. Disposal of plastics
Improper disposal of plastics clogs water systems and releases toxins, affecting aquatic ecosystems.

(b) What measures should be taken to overcome the problem described in (5) (a)?

i. Proper disposal of agricultural chemicals
Ensures that harmful substances do not leach into water sources.

ii. Establish buffer zones

Vegetation strips around water bodies filter runoff, preventing pollution.

iii. Promote organic farming
Encourages the use of natural fertilizers, reducing reliance on chemical inputs.

iv. Improve waste management
Develop efficient systems to collect and recycle waste, particularly plastics.

v. Enforce environmental laws
Regulates and penalizes activities that pollute water bodies, ensuring compliance with best practices.

6. (a) (i) No one country is self-sufficient in producing all that it needs. Justify this statement.

i. Differences in resource availability
No country possesses all the resources required for production. For example, some countries have oil reserves, while others have fertile agricultural land.

ii. Climatic variations
Different climatic conditions favor the production of specific goods in different regions, necessitating trade.

iii. Technological gaps
Countries vary in their level of technology, which affects the ability to produce certain goods efficiently.

(ii) Why is trade across borders of a country important?

i. Access to scarce resources
Countries can import goods and resources they lack, ensuring a steady supply for their needs.

ii. Economic growth
Trade generates revenue through exports, improving the economic status of a country.

iii. Strengthening international relations
Fosters cooperation and partnerships among nations, leading to mutual benefits and stability.

(b) Propose four measures that a country can take to correct deficit in the balance of payment.

i. Increase exports
Encouraging the production and export of goods increases foreign exchange earnings, reducing the deficit.

ii. Reduce imports
Limiting non-essential imports saves foreign currency, improving the trade balance.

iii. Promote foreign investment

Attracting foreign direct investment brings capital inflows, helping to offset deficits.

iv. Devalue the currency
A weaker currency makes exports cheaper and imports more expensive, boosting export competitiveness.

7. (a) Account for any three agents of erosion.

i. Water
Flowing water removes soil particles, particularly during heavy rains, leading to gully and sheet erosion.

ii. Wind
Strong winds lift and transport loose soil particles, especially in arid and semi-arid regions.

iii. Human activities
Deforestation, overgrazing, and improper agricultural practices expose soil, making it vulnerable to erosion.

(b) Construction of terraces is among the physical/structural control of soil erosion in sloping areas. Briefly explain seven types of terraces that can be constructed on sloping areas for erosion control.

i. Bench terraces
Steps cut into the slope reduce water runoff and allow farming on sloping lands.

ii. Contour terraces
Terraces aligned with contour lines slow down water movement and prevent soil erosion.

iii. Narrow-based terraces
Smaller ridges built on steep slopes reduce erosion and are easy to maintain.

iv. Broad-based terraces
Wide terraces that combine farming and erosion control in gently sloping areas.

v. Graded terraces
Constructed with a gentle slope to channel water safely away from farmland.

vi. Retention terraces
Designed to hold water in place, reducing runoff and increasing water infiltration.

vii. Reverse-slope terraces
Sloped backward to direct water into controlled channels, minimizing erosion.

8. A moist soil sample weighed 100 g. After oven dry, the weight dropped to 90 g. Suppose the total volume of the soil sample is 80 cm^3, and the volume of pore space is 40 cm^3.

(a) Bulk density of the soil
Bulk density = Oven dry weight / Total volume = 90 g / 80 cm^3 = 1.125 g/cm^3

(b) Particle density of the soil
Particle density = Oven dry weight / Volume of solids
Volume of solids = Total volume - Volume of pore space = 80 cm^3 - 40 cm^3 = 40 cm^3
Particle density = 90 g / 40 cm^3 = 2.25 g/cm^3

(c) Porosity of the soil
Porosity = (Volume of pore space / Total volume) × 100
Porosity = (40 cm^3 / 80 cm^3) × 100 = 50%

9. (a) (i) What disease could be affecting the crop?
Bacterial wilt

(ii) How does the disease spread in the field?
Spreads through contaminated soil, water, infected plant material, and farm tools.

(b) Educate farmers on the possible ways of controlling the disease identified in (a) (i).

i. Use certified, disease-free seeds
Prevents the introduction of bacteria into the field.

ii. Practice crop rotation
Growing non-host plants disrupts the life cycle of the bacteria.

iii. Sterilize tools and equipment
Prevents the transfer of bacteria between plants and fields.

iv. Improve drainage
Avoid waterlogging, as bacteria thrive in wet soil conditions.

10. Explain three causes of price changes and five ways to protect agricultural products from such changes.

Causes:
i. Seasonal variations
Supply fluctuates due to planting and harvesting seasons, causing price instability.

ii. Demand changes
Shifts in consumer preferences or population growth affect the demand for certain products.

iii. Natural disasters
Floods, droughts, and pests disrupt production, reducing supply and driving up prices.

Ways to protect:
i. Store produce in modern facilities
Preserves quality and prevents spoilage, stabilizing supply.

ii. Diversify crops
Growing a variety of crops spreads risk and ensures income stability.

iii. Form cooperatives
Enables farmers to negotiate better prices and pool resources.

iv. Add value to products
Processing raw produce into finished goods increases market appeal and profitability.

v. Insure crops
Protects farmers from losses due to unforeseen circumstances like disasters.
11. Advice on controlling the habit of feather pecking in broilers.

i. Provide adequate space
Overcrowding increases stress and aggression among birds.

ii. Ensure a balanced diet
Nutritional deficiencies lead to abnormal behaviors such as pecking.

iii. Reduce light intensity
Dim lighting calms birds and reduces aggressive tendencies.

iv. Introduce distractions
Provide toys, perches, or hanging objects to keep birds engaged and reduce stress.

v. Trim beaks
Careful trimming minimizes damage from pecking without harming the birds.

vi. Separate aggressive birds
Removing peckers from the flock protects other birds and prevents further injuries.