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: 2017**

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. A crop that lives for more than two years in the field is known as
A. cash crop
B. food crop
C. annual crop
D. biannual crop
E. perennial crop

A perennial crop is one that grows for more than two years, producing harvests multiple times before replanting is necessary.
Correct answer: E

ii. The common sickness symptom in livestock is
A. continuous salivation
B. loss of appetite
C. anaemia
D. body itching
E. discharge of tears

Loss of appetite is one of the most common signs of illness in livestock, as it often indicates underlying infections or metabolic issues.
Correct answer: B

iii. The degree to which the technical advice of the extension worker is believed by the clients is referred to as
A. sympathy
B. commitment
C. empathy
D. enthusiasm
E. credibility

Credibility is the trustworthiness or reliability of the extension worker's advice based on expertise, experience, and accuracy.
Correct answer: E

iv. Prices that traders pay when they buy goods at the sites of production are termed as
A. retail prices
B. market prices
C. farmgate prices
D. wholesale prices
E. shadow prices

Farmgate prices are the prices that producers receive when they sell directly from their farms before transportation or middlemen involvement.
Correct answer: C

v. Which one of the following transforms reciprocating motion into rotary motion in an engine?
A. Flywheel
B. Push rod
C. Crankshaft
D. Camshaft
E. Timing gear

The crankshaft converts the up-and-down (reciprocating) motion of the pistons into rotary motion to drive the vehicle or machinery.
Correct answer: C

vi. What is the common similarity among all soils?
A. They are made up of small particles
B. They retain water equally
C. They are made from rocks
D. They are made from rocks
E. They have the same volume of air spaces

All soils originate from the weathering of rocks over time, making rock the fundamental component of soil formation.
Correct answer: C

vii. Which one of the following is a task of a drone?
A. Cleaning the cells
B. Mating and fertilizing the queen
C. Nectar reception
D. Feeding bred queen
E. Comb building

Drones are male bees whose primary role is to mate with the queen to ensure colony reproduction.
Correct answer: B

viii. Which one is the effect of soil erosion?
A. Rendering land unsuitable for agricultural production
B. Decrease siltation of dams, streams, rivers, and lakes
C. Increase stability of plant roots
D. Accumulation of nutrients to the deep soil
E. Loss of fertile deep soil

Soil erosion removes topsoil, reducing fertility and making land unsuitable for farming.
Correct answer: A

ix. Which question is to be asked by the farmer as a producer upon choosing the technique to employ in production?
A. What to produce?
B. How much to produce?
C. How to produce?
D. What price to sell?
E. How much of each input to use?

How to produce is a key production decision that determines the efficiency and sustainability of farming techniques.
Correct answer: C

x. What does the term 'lard' mean in pig husbandry?
A. fat
B. skin
C. hair
D. milk
E. meat

Lard refers to the fat from pigs, which is used in cooking and industrial applications.
Correct answer: A

2. Match the items in List A with the responses in List B by writing the letter of the correct response from List B beside the item number in the answer booklet provided.

List A
i. The element that promotes the uptake of nutrients in plants
ii. The element which strengthens the cell walls so that the straw becomes stiff and resistant to lodging
iii. The element which is an essential catalyst in the production of chlorophyll in plants
iv. The element that promotes vegetative growth and encourages the development of good quality leaves
v. The element that promotes the formation of roots and seeds and stimulates flowering in plants
vi. The element which increases the efficiency of the leaf in the manufacturing of sugars and starch in plants
vii. The element that activates protein digestive enzymes in plants
viii. The element which is a very important constituent in the production of energy in plants
ix. The element that catalyzes oxidation processes in plant cells and regulates sugar consumption in plants
x. The element which is involved in many physiological functions of the plants

List B

A. Phosphorus
B. Nitrogen
C. Hydrogen
D. Copper
E. Oxygen
F. Zinc
G. Molybdenum
H. Magnesium
I. Carbon
J. Potassium
K. Cobalt
L. Iron
M. Sulphur
N. Manganese
O. Calcium

Answers
i. J
ii. O
iii. L
iv. B
v. A
vi. H
vii. F
viii. M
ix. D
x. G

3. (a) What is meant by 'soil formation'?

Soil formation refers to the natural process through which rocks break down over time into smaller particles, mixing with organic matter to create soil. This process is influenced by various factors such as climate, organisms, topography, parent material, and time.

(b) Account for five factors that influence soil formation.

i. Parent material – The type of rock from which soil is formed affects its texture, mineral content, and fertility. Hard rocks take longer to weather than soft rocks.
ii. Climate – Temperature and rainfall influence the rate of weathering. High rainfall leads to leaching, while dry conditions slow down soil formation.
iii. Biological factors – Microorganisms, plants, and animals contribute to soil formation by decomposing organic matter and mixing soil layers.

iv. Topography – Steep slopes experience more erosion, reducing soil depth, while flat areas accumulate more organic matter and nutrients.
v. Time – Soil formation is a slow process, taking hundreds to thousands of years. Older soils tend to be more developed than younger soils.

4. (a) What are the agricultural extension teaching methods?

Agricultural extension teaching methods are techniques used by extension officers to educate farmers on improved agricultural practices. These methods are classified into three main types: mass methods, group methods, and individual methods.

(b) Elaborate the purpose of each of the following agricultural extension teaching methods and in each give four ways in which it can be conducted.

(i) Mass methods

Purpose: Used to reach a large number of farmers at the same time, creating awareness about new farming technologies and agricultural practices.

Ways of conducting:
i. Radio programs – Broadcasting agricultural advice on farming techniques.
ii. Television shows – Educating farmers through visual demonstrations.
iii. Print media – Publishing articles in newspapers, leaflets, and brochures.
iv. Public demonstrations – Conducting large-scale field demonstrations in agricultural exhibitions.

(ii) Individual methods

Purpose: Provides personalized agricultural knowledge and practical solutions tailored to individual farmers' needs.

Ways of conducting:
i. Farm visits – Extension officers visit individual farms to offer guidance.
ii. Personal letters – Sending written advice to individual farmers.
iii. Telephone calls – Communicating with farmers directly for quick solutions.
iv. Office consultations – Farmers visit extension offices for expert advice.

5. (a) Give the meaning of the following terms as they are used in poultry production.

(i) Incubation – The process of keeping fertilized eggs under controlled temperature and humidity to promote embryo development until hatching.
(ii) Brooder – A heated enclosure used to provide warmth to young chicks during the early stages of life.
(iii) Broody hen – A hen that shows the natural instinct to sit on eggs and hatch them.

(b) (i) What do you understand by natural brooding?

Natural brooding is the process where a broody hen incubates and hatches eggs naturally without using artificial incubators.

(ii) Examine four disadvantages of natural brooding.

i. Limited egg capacity – A hen can only incubate a small number of eggs at a time compared to artificial incubators.
ii. High risk of predation – Chicks hatched under natural brooding are more vulnerable to predators.
iii. Irregular hatching – Some eggs may fail to hatch due to poor temperature regulation by the hen.
iv. Labor-intensive – Farmers must provide extra care to ensure the hen is comfortable and protected.

6. (a) Give the mathematical expression of elasticity of demand.

Elasticity of demand = (Percentage change in quantity demanded) ÷ (Percentage change in price)

(b) Briefly describe the following types of elasticity of demand and make sketches to illustrate your answer.

(i) Elastic demand – A situation where a small change in price leads to a significant change in quantity demanded. This usually applies to luxury goods.

(ii) Unitary demand – When a change in price leads to a proportional change in quantity demanded. The total revenue remains unchanged.

(iii) Inelastic demand – When a change in price leads to a small or negligible change in quantity demanded. This applies to essential goods like food and medicine.

7. (a) Account for six factors to be considered when siting an apiary in the farm.

i. Availability of flowering plants – Ensures a continuous source of nectar for honey production.
ii. Protection from strong winds – Prevents disturbance to the beehives.
iii. Accessibility – The site should be easy to reach for regular inspection and honey harvesting.
iv. Distance from human settlements – Prevents bee stings and disturbances to people.
v. Water availability – Bees require water for cooling their hives and diluting honey.
vi. Good drainage – The site should not flood, as excess moisture affects hive conditions.

(b) Briefly explain three human activities causing destruction of fisheries in Tanzania.

i. Overfishing – Excessive harvesting of fish reduces population sizes and disrupts aquatic ecosystems.
ii. Use of illegal fishing gear – Destructive methods such as dynamite fishing kill fish indiscriminately and destroy marine habitats.

iii. Pollution – Industrial waste, plastics, and agricultural chemicals contaminate water bodies, affecting fish health and breeding.

8. (a) Briefly describe how the four agents of erosion cause soil erosion.

i. Water erosion – Rainfall and runoff remove the topsoil, leading to loss of nutrients and soil degradation.
ii. Wind erosion – Strong winds blow away loose soil particles, especially in dry and sandy areas.
iii. Ice erosion – Glaciers scrape and transport soil, reshaping landscapes over time.
iv. Human activities – Deforestation, overgrazing, and poor farming practices contribute to soil loss.

(b) Assess three ways in which trees contribute in controlling soil erosion.

i. Root stabilization – Tree roots bind soil particles together, reducing erosion.
ii. Windbreaks – Trees act as barriers, reducing wind speed and preventing soil displacement.
iii. Canopy cover – Tree leaves intercept rain, reducing the impact of raindrops on the soil.

9. (a) State four advantages of using an ox as a source of power in the farm.

i. Cost-effective – Oxen are cheaper to maintain than tractors and do not require fuel.
ii. Suitable for small farms – They can be used in small plots where tractors may not be practical.
iii. Provide manure – Oxen produce dung, which improves soil fertility.
iv. Adaptability – They can work in difficult terrains and do not require complex maintenance.

(b) Point out the service required in the following parts of a tractor.

(i) Radiator – Regularly check and refill coolant to prevent overheating.
(ii) Fan belt – Inspect and adjust tension to ensure proper cooling system function.
(iii) Tyres – Maintain proper inflation and check for wear and tear.

10. (a) (i) What is the meaning of cultural pest control?

Cultural pest control involves the use of agricultural practices such as crop rotation, timely planting, and intercropping to reduce pest populations.

(ii) Elaborate the basic principle behind cultural pest control.

The principle is to create unfavorable conditions for pests by altering the environment, reducing pest breeding sites, and interrupting their life cycles.

(iii) Briefly explain the mechanism of using trap crops as a pest control method.

Trap crops are plants grown alongside main crops to attract pests away, reducing damage to the primary crop.

(b) Stainers are insect pests causing destruction to different crops.

(i) Name two common crops attacked by stainers.
Cotton and tomatoes.

(ii) State one effect of stainers on crops they attack.
They suck plant juices, leading to discoloration and reduced crop quality.

(iii) Suggest one cultural control measure for stainers.
Early planting to avoid peak infestation periods.

11. Extension teaching methods are often classified in terms of the target audience. Describe the extension teaching method which targets a large number of people in different locations.

The extension teaching method that targets a large number of people in different locations is called mass extension method. This method aims at reaching many farmers at the same time with agricultural knowledge, innovations, and improved techniques.

characteristics of mass extension method

i. reaches a wide audience, making it efficient for delivering agricultural knowledge
ii. uses media such as radio, television, newspapers, and posters
iii. requires minimal personal interaction between extension workers and farmers
iv. provides general information, not customized advice for individual farmers

examples of mass extension methods

i. radio programs – agricultural experts broadcast farming advice to a large audience
ii. television programs – visual demonstrations help farmers understand new farming techniques
iii. print media – magazines, newspapers, and leaflets provide detailed farming guides
iv. agricultural exhibitions – public displays showcase new technologies, improved seeds, and better farming practices

mass extension methods play a crucial role in spreading agricultural knowledge efficiently, especially in remote areas where personal extension visits may not be frequent.

12. account for eight human activities that cause degradation on land and suggest seven ways of managing land degradation caused by human activities.

human activities causing land degradation

i. deforestation – cutting down trees exposes soil to erosion and reduces biodiversity
ii. overgrazing – excessive livestock grazing removes vegetation cover, leading to soil erosion
iii. mining activities – extraction of minerals disturbs the soil, leaving barren lands
iv. urbanization – construction of buildings and roads leads to loss of arable land
v. agricultural mismanagement – overuse of chemical fertilizers and poor irrigation practices degrade soil health
vi. industrial pollution – disposal of toxic chemicals contaminates soil and reduces fertility
vii. waste dumping – uncontrolled disposal of plastics and non-biodegradable materials pollutes land
viii. burning of vegetation – clearing land using fire destroys soil structure and reduces organic matter

ways of managing land degradation

i. afforestation and reforestation – planting trees to restore degraded lands
ii. proper grazing management – rotational grazing to prevent overgrazing
iii. soil conservation techniques – using terraces, contour farming, and mulching to prevent erosion
iv. sustainable mining practices – implementing land reclamation and responsible mining activities
v. urban planning – proper land-use policies to prevent unnecessary destruction of arable land
vi. organic farming – reducing chemical input and adopting eco-friendly farming methods
vii. waste management – encouraging recycling and proper waste disposal methods to reduce land pollution

implementing these measures will ensure sustainable land use while maintaining soil fertility for agricultural productivity.

13. weeds are both enemies and friends in crop and animal production. discuss this statement giving relevant examples.

weeds can have both positive and negative effects on agricultural production, making them both enemies and friends in farming.

ways in which weeds are enemies in crop and animal production

i. competition for nutrients – weeds absorb soil nutrients, reducing availability for crops. for example, striga weed competes with maize, lowering yields
ii. water competition – weeds use moisture from the soil, leading to drought stress in crops
iii. harboring pests and diseases – weeds provide breeding grounds for insects and pathogens that attack crops. for example, couch grass harbors nematodes that damage roots
iv. reduction in pasture quality – some weeds are unpalatable or toxic to livestock, reducing grazing land quality

v. difficulty in harvesting – weedy fields slow down harvesting and increase production costs
vi. allelopathic effects – some weeds release chemicals that inhibit the growth of crops. for example, sunflower residue can hinder the germination of other plants

ways in which weeds are friends in crop and animal production

i. soil improvement – some weeds, like legumes, fix nitrogen in the soil, improving fertility
ii. prevention of soil erosion – weed cover protects soil from erosion, especially in dry areas
iii. source of animal feed – certain weeds, like amaranth, can be used as livestock fodder
iv. medicinal value – some weeds have medicinal properties, such as aloe vera and neem
v. biodiversity enhancement – weeds support beneficial insects such as pollinators and natural predators of crop pests

conclusion, weeds play both beneficial and harmful roles in agriculture. while they can reduce crop productivity and increase production costs, they also contribute to ecological balance and soil fertility. farmers should adopt integrated weed management strategies to minimize the negative effects while maximizing the benefits of useful weeds.