THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

134/3 **AGRICULTURE 3**

(For Both School and Private Candidates)

Time: 3 Hours **ANSWERS** **Year: 2025**

Instructions

1. This paper consists of **three (3)** questions.
2. Answer **all** questions.
3. Question **one (1)** Carries **twenty (20)** marks; question **two (2)** and **three (3)** carry **fifteen (15)** marks each.
4. Cellular phones are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

1. You are provided with specimens' C (1 wooden box half filled with garden soil and transplanted with bean seedlings and young blackjack weeds at random) and D (10 cm^3 herbicide), source of water, graduated hand sprayer, measuring cylinders and a stop watch. Perform the following procedures then answer the questions that follow:

(a) What is the aim of the experiment?

The aim of the experiment is to determine the effect of a diluted herbicide solution on both bean seedlings and blackjack weeds when sprayed uniformly on plant surfaces.
It also aims to test the selectivity of the herbicide by observing whether it kills only weeds or affects crop plants as well.
The experiment further aims to demonstrate proper herbicide preparation, mixing and spraying techniques for agricultural use.

(b) What have you observed to plants grown on specimen C after 20 minutes?

After 20 minutes, the bean seedlings and blackjack weeds show early signs of wilting as a result of herbicide contact with leaf tissues.
Some leaves begin to curl or lose firmness due to chemical interference with cellular processes.
Blackjack weeds generally respond faster, showing more visible damage because they are more sensitive to herbicide application.

(c) What fault has been noted from your observations in part (b)? Give the cause of the fault.

The major fault noted is that both weeds and bean seedlings show damage, meaning the herbicide killed or injured the crop plants as well.
This fault occurs because the concentration of specimen D was excessively strong, causing non-selective herbicide action.

It also occurs because the spraying was done on all plant parts without protecting the desired plants, leading to uniform exposure.

(d) If the quantity of specimen D used can spray an area of 1000 m², calculate the amount of specimen D a farmer should buy in order to spray his 10-hectare maize field.

10 hectares = 10 × 10,000 m² = 100,000 m².

If 10 cm³ of specimen D covers 1000 m², then for 100,000 m²:

100,000 ÷ 1000 = 100.

Therefore, the farmer needs 100 × 10 cm³ = 1000 cm³ of specimen D.

(e) Advise the farmer on the proper ways of handling and using specimen D. Give seven points.

The farmer should always dilute the herbicide according to manufacturer instructions to avoid harming crops.

He should wear protective clothing such as gloves, masks and goggles to prevent skin and respiratory contact.

He must avoid spraying herbicide on windy days because drift can damage neighbouring crops.

The farmer should always calibrate his sprayer to apply the correct amount of herbicide.

He should store herbicides in locked, well-ventilated areas away from food and children.

The farmer should wash equipment and hands thoroughly after applying herbicides to reduce health risks.

He must dispose of empty herbicide containers safely by following recommended disposal guidelines.

(f) Account for the three modes of action of specimen D.

One mode of action is contact killing, where the herbicide destroys plant tissues upon direct contact with leaves or stems.

A second mode of action is systemic action, where the herbicide moves internally through plant sap and kills tissues in roots and shoots.

A third mode of action is residual action, where herbicide remains in the soil and prevents new weed germination for some time.

2. You are provided with specimens T (live tick) and U (live tick), X (concentrated acaricides) and Y (diluted acaricides). Perform the procedures then answer the questions:

(a) What is the aim of the experiment?

The aim of the experiment is to compare the effectiveness of concentrated acaricide and diluted acaricide in killing ticks.

It also aims to demonstrate the correct handling and application procedures for acaricides.

The experiment further aims to evaluate which formulation provides faster and more reliable tick control.

(b) What have you noticed from the experiment?

The tick exposed to concentrated acaricide (specimen X) dies or becomes paralysed more rapidly.

The tick exposed to diluted acaricide (specimen Y) responds more slowly or shows delayed effects.

This shows that acaricide strength influences the speed and reliability of tick mortality.

(c) From the results of experiment, which specimen would you recommend for use between X and Y?

Specimen X is recommended because it shows faster and more effective killing of ticks.

Specimen X provides stronger control and reduces the chance of ticks surviving treatment.

It also ensures lower transmission of tick-borne diseases due to rapid tick elimination.

(d) Briefly explain the stages of development from the egg to adult that specimens T and U can pass if the farmer is keeping only one cattle.

The tick first hatches from the egg into a larva, which has six legs and seeks a host for feeding.

After feeding, it drops to the ground and moults into an eight-legged nymph, which again seeks the host for feeding.

Finally, it moults into an adult tick, attaches to the host and feeds to complete its life cycle.

(e) The farmer was keeping a large number of cattle which were severely infected with various species of specimens T and U. Suggest the possible disease that may occur to the farmer's herd if the recommended specimen in part (c) is not used.

East Coast Fever may occur because it is transmitted by ticks.

Anaplasmosis may also occur as ticks transmit blood parasites that damage red blood cells.

Babesiosis may develop because tick bites transfer protozoa that destroy blood cells and cause fever.

(f) Briefly explain three methods of applying specimen X on animals.

Dipping is used by immersing cattle in a dip tank containing acaricide solution that

covers their entire body.
Spraying is performed using high-pressure sprayers to distribute acaricide evenly on the animal's skin.
Pour-on application involves pouring measured acaricide along the animal's back, where it spreads across the skin.

3. You are provided with specimen M (10 litres capacity bucket filled with water), knapsack sprayer and a wall clock. Answer the questions:

(a) What difference was noticed when pumping the operating handle?
When pumping the handle, pressure builds inside the sprayer tank.
The handle becomes harder to pump as pressure increases.
A continuous spray begins when the required pressure is reached.

(b) Briefly explain the implication of the difference noticed in part (a).
The change in pressure indicates that the sprayer is ready for use and can produce a fine spray.
It also shows that the pump mechanism is functioning properly to create uniform spray distribution.
Adequate pressure ensures effective pest control by delivering the correct droplet size.

(c) Why is the on-off lever not pressed before and during pumping the operating handle?
Pressing the lever releases pressure, preventing the tank from building pressure needed for spraying.
It also wastes water or pesticide before the system is ready to spray.
Keeping the lever closed ensures proper pressure generation inside the sprayer.

(d) Briefly describe the pattern of liquid observed coming out.

The liquid comes out as a fine mist that spreads outward in a cone-shaped pattern.

The droplets are small and uniform, allowing even coverage on plant surfaces.

The spray forms a continuous cloud-like pattern indicating proper atomisation.

(e) Which part of the sprayer is responsible for making liquid pattern in part (d)?

The nozzle is responsible for forming the liquid pattern.

It controls droplet size and the shape of the spray.

Its internal design determines how liquid is broken into fine mist.

(f) Proper working of the part named in (e) is essential for efficient functioning of sprayer. How would you maintain the part?

The nozzle should be cleaned after each use to remove dirt or chemical residues that block openings.

It should be checked regularly for wear or damage that may distort the spray pattern.

It must be stored dry to prevent corrosion and ensure long-term function.

(g) What are the factors to consider when carrying out procedure (i) – (iii) in the field of crops for controlling pests? Give five points.

The direction of wind must be considered to avoid chemical drift that may affect nearby crops.

The sprayer should be calibrated to ensure correct application rate of chemicals.

Operators must wear protective equipment to avoid exposure to chemicals.

Weather conditions such as rain or strong sun must be monitored because they affect chemical effectiveness.

The growth stage of the crop should be considered to ensure the spray reaches target pests effectively.