THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

034/2 AGRICULTURE 2

Time : 3 Hours ANSWERS Year : 2022

## Instructions

1. This paper consists of two questions.
2. Answer **all** questions.
3. Communication devices and any unauthorised materials are **not** allowed in the examination room.
4. Write your **Examination Number** on every page of your answer booklet(s).

1. You are provided with the specimens, apparatuses and materials as follows: A, B, Measuring cylinder, Beaker, distilled water and Stirring rod. Perform the following procedures and answer the questions that follow:

Procedures

(i) Put 100 $cm^3$ of water in the 250 $cm^3$ measuring cylinder.

(ii) Using a beaker, put soil sample A up to 100 $cm^3$ mark and pour the soil into the 250 $cm^3$ measuring cylinder with 100 $cm^3$ of water.

(iii) Record the volume of the mixture in the measuring cylinder.

(iv) Repeat steps (i) – (iii) using soil sample B.

(v) Cover the mouth of the measuring cylinder with a hand and shake well, do it for both cylinders.

(vi) Stir the mixtures with a stirring rod so that all the bubbles come out.

(vii) After all the bubbles have escaped, record the final reading of the mixture in both cylinders.

Questions

i) What caused the bubbles to come out?

The bubbles came out because the water displaced the air that was trapped between the soil particles. As the water filled the spaces, the air was forced to escape in the form of bubbles.

ii) Why did you stir the mixture for bubbles to come out?

The mixture was stirred to speed up the release of air trapped in the soil pores. Stirring allows water to penetrate more thoroughly into the spaces, ensuring all the air is displaced and rises as bubbles.

iii) Comment with reason on the volume of the mixture before and after shaking and stirring in both cylinders.

The volume of the mixture before shaking and stirring is higher than the volume after shaking and stirring. This is because before stirring, the soil particles trap air which occupies space, but after stirring, the air escapes as bubbles, leaving only soil and water in the cylinder, thus lowering the volume.

iv) Compare the volume of bubbles lost in soil samples A and B. Give reasons to support your answers.

The volume of bubbles lost in soil sample A may be higher than that in soil sample B. This is because soil sample A might be sandy with larger air spaces that hold more air, while soil sample B might be clay with smaller pore spaces, hence less air to escape.

v) State the relationship between bubbles that have been lost in the experiment and water in the soil.

The bubbles represent the volume of air that was displaced by water. This shows that soil has pore spaces filled with air, and water enters by replacing the air, which is essential for plant growth and soil aeration.

vi) What conclusion can you draw from the experiment you have done?

The conclusion is that soil contains air trapped in spaces between soil particles, and this air is essential for respiration of plant roots and soil organisms.

2. You are provided with specimen G filled with water and bucket. Perform the following procedures and answer the questions that follow:

Procedures

(i) Strap specimen G in the back in a comfortable position.

(ii) Use the handle to pump up and down until it becomes hard to do so, then stop.

(iii) Direct the lance into the bucket provided.

(iv) Press the trigger control to release the content in the tank into the bucket and observe its flow for one minute.

(v) Unstrap the specimen.

Questions

(i) Briefly describe the purpose of doing procedure (ii).

The purpose of pumping up and down is to build pressure inside the tank so that the liquid can be forced out through the nozzle when the trigger is pressed.

(ii) Assume you are spraying pesticide on crops in the field (procedure (iv)), outline three important safety precautions would you have to consider.

One precaution is to wear protective clothing such as gloves, goggles and masks to prevent contact with the pesticide. Another precaution is to avoid spraying on a windy day to prevent the chemical from drifting and causing harm to the applicator or nearby people. A third precaution is to wash hands and equipment thoroughly after spraying to prevent contamination and poisoning.

(iii) How would you care for and maintain part of specimen G that disperses liquid spray into the spray area? Give six points.

First, clean the nozzle after every use to prevent blockage from pesticide residues.

Second, flush the lance and pipes with clean water after spraying to remove chemical deposits.

Third, store the sprayer in a cool and dry place to avoid rusting of metallic parts.

Fourth, regularly check for leaks in the nozzle and pipes and repair them to ensure proper spraying.

Fifth, lubricate the moving parts of the handle to maintain smooth operation. Sixth, replace worn-out nozzles and washers to maintain effective and uniform spraying.