THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

033/2A **BIOLOGY 2A**

(ACTUAL PRACTICAL A)

(For Both School and Private Candidates)

Time: 2:30 Hours **ANSWERS** **Year: 2024**

Instructions

1. This paper consists of two questions.

2. Answer all questions.

1. You have been provided with specimen X which has been exposed to direct sunlight for 5 hours while attached to the mother plant. Also, you are provided with methylated spirit and iodine solution. Use them to perform the experiment in procedures (i) - (iv), then answer the questions that follow:
(a) What was the aim of the experiment?
The aim of the experiment was to test for the presence of starch in a leaf, indicating whether photosynthesis had occurred.

(b) Why was specimen X boiled in water for about 4 minutes?
Boiling the leaf in water softens it and kills the cells, stopping all metabolic processes. This also makes it easier for the chemicals (methylated spirit and iodine) to penetrate the leaf.

(c) Identify the observation made when specimen X was boiled in methylated spirit.
The green color of the leaf (chlorophyll) was removed, and the leaf turned pale or whitish.

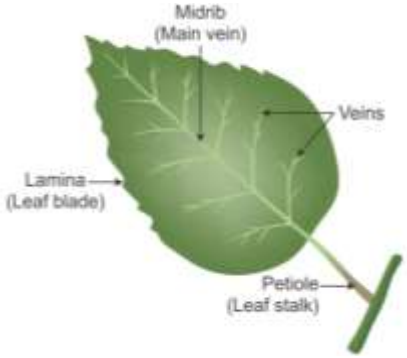
(d) Briefly explain one importance for each of the following:
(i) Putting specimen X in hot methylated spirit.
This removes chlorophyll from the leaf so that any color change due to iodine can be seen clearly.
(ii) Placing a test tube containing specimen X and methylated spirit in a beaker of boiling water.
Methylated spirit is highly flammable, so indirect heating using a water bath prevents ignition and ensures safe and uniform heating.

(e) Identify the texture of specimen X after:
(i) removing the specimen from hot methylated spirit.
The leaf becomes brittle or hard.
(ii) rinsing the specimen with warm water.
The leaf becomes soft and flexible again.

(f) Give your observation when iodine solution was added on the surface of specimen X.
The areas of the leaf exposed to sunlight turned blue-black, indicating the presence of starch.

(g) What is your conclusion about the results of the experiment in procedures (i) – (iv)?
The presence of starch in the leaf confirms that photosynthesis took place in the regions exposed to sunlight.

(h) Draw a diagram of specimen X and label four external parts.



2. You have been provided with specimens S, T, U and V. Study them and answer the following questions:
(a) (i) State three distinctive characteristics for placing specimen V and S in the same kingdom.
- Both are multicellular organisms.
- Both perform photosynthesis (contain chlorophyll).
- Both have cell walls made of cellulose.

(ii) State three characteristics that made each of the specimens V and S to belong to different divisions.
- Specimen V has vascular tissues; specimen S may not.
- Specimen V has true roots, stems, and leaves; specimen S lacks these.
- Specimen V reproduces using seeds; specimen S reproduces using spores.

(iii) Explain three importance of specimen S to human beings.
- It provides food and nutrients as some species are edible.
- It contributes to soil fertility and prevents erosion.
- It serves medicinal or cultural purposes in some communities.

(iv) Identify reproductive structure shown by specimens V and S.
- Specimen V: seeds or flowers.
- Specimen S: spores or sporangia.

(b) Closely observe specimen S and then identify the floral arrangements which are typical characteristics of the class it belongs.
Specimen S may show clustered sporangia, sori (if a fern), or other spore-bearing structures typical of Pteridophyta.

(c) (i) Identify each of specimens T and U by its common name.
- Specimen T: likely a moss.
- Specimen U: likely an algae.

(ii) Classify specimens T and U to the division level.
- Specimen T: Bryophyta.
- Specimen U: Algae (or Chlorophyta, depending on the species).

(iii) Give three reasons for specimen T to belong to the respective division.
- It lacks true roots, stems, and leaves.
- It reproduces via spores.
- It grows in moist environments and absorbs water by diffusion.

(d) Explain importance of specimen U to the environment.
- Produces oxygen through photosynthesis.
- Forms the base of aquatic food chains.
- Helps in nutrient recycling in aquatic ecosystems.