THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

033/2C **BIOLOGY 2C**

(ACTUAL PRACTICAL C)

(For Both School and Private candidates)

Time: 2:30 Hours **Year: 2021**

Instructions

1. This paper consists of **two (2)** questions**.**
2. Answer **all** questions**.**
3. Each question carries twenty **five (25)** marks**.**
4. All writing must be in **blue** or **black** ink **except** drawing which must be in pencil.
5. Cellular phones, and any unauthorized materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet (s)

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1. You are provided with stirring rod, delivery tube, test tube, Irish potato, scalpel, measuring cylinder and solutions in the beakers labeled by letters $\mathbf{N_1}$, $\mathbf{N_2}$, $\mathbf{N_3}$, and $\mathbf{N_4}$. Follow the procedures as directed in (i)-(vii) to demonstrate the process of capillarity and osmosis experiments, and answer the questions that follow.

   (i) Dip a delivery tube in the beaker containing solution $\mathbf{N_1}$ and a stirring rod in the beaker containing solution $\mathbf{N_2}$ until it reaches 5 cm deep while holding them careful to ensure that they do not touch the bottom of the beakers for 5 minutes.

   (ii) Remove the delivery tube and stirring rod from the beakers containing solution $\mathbf{N_1}$ and $\mathbf{N_2}$ after 5 minutes and observe what is happening.

   (iii) Peel the Irish potato to remove the outer cover and chip it to make four (4) small bars of about 4 cm long and 3 mm thick.

   (iv) Place two bars in a test tube which is half filled with water. Boil for 2 minutes and allow it to cool.

   (v) Place one boiled bar and one unboiled bar into the beaker containing solution $\mathbf{N_3}$.

   (vi) Place one boiled bar and one unboiled bar into the beaker containing solution $\mathbf{N_4}$.

   (vii) After 30 minutes remove the bars from solutions $\mathbf{N_3}$ and $\mathbf{N_4}$. Try to bend each bar and touch to feel its texture.

Questions

(a) What was your observation after 5 minutes when a delivering tube and stirring rod were deepened into solutions $\mathbf{N_1}$ and $\mathbf{N_2}$ in procedure (i)?

(b) Account for observation made in procedure (i).

(c) Which of the beakers $\mathbf{N_1}$ and $\mathbf{N_2}$ acted as a control of the capillarity experiment? Give reason to support your answer.

(d) Which tissue found in plants can perform the same function as represented by

delivery tube in this experiment?

(e) How does the function of capillarity investigated in this experiment important for the survival of the plants?

(f) (i) What was the texture of each bar after removing them from the solution **N_3**?

(ii) Briefly explain the cause of each texture observation in (f) (i).

(g) (i) What was the texture of each bar after removing them from the solution **N_4**?

(ii) Briefly explain the cause of each texture observed in (g) (i).

(h) Which of the bars in solutions **N_3** and **N_4** acted as a control of osmosis experiment? Give reason to support your answer.

(i) Which of the solutions **N_3** and **N_4** had the following:

(i) higher concentration of water molecules?

(ii) higher concentration of solute molecules?

2. You are provided with specimens **A**, **B, C** and **D**, study them carefully and answer the following questions:

(a) (i) Identify each of the specimens **A, B, C** and **D** by its common name.

(ii) Why scientists prefer binomial nomenclature in naming the organisms **A, B, C** and **D** instead of common names?

(b) (i) Classify the specimen **A** to Phylum level.

(ii) Give two benefits of the specimen **A** to man.

(c) Classify each of the specimens **C** and **D** to class level.

(d) Why are the specimens **C** and **D** placed in the same phylum but different classes?

(e) What are the two benefits that specimen **B** has in the ecosystem?