THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

033/2C **BIOLOGY 2C**

(ACTUAL PRACTICAL 2C)

Time : 3 Hours **ANSWERS** **Year : 2024**

Instructions

1. This paper consists of **two (2)** questions. Answer all questions.
2. Each question carries **twenty five (25)** marks.
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).

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1. You have been provided with solution B, specimen R, chemical reagents and the required apparatuses. Use them to respond to the following questions:

(a) Prepare a solution by using specimen B and label it as Solution B. Outline the procedure you used to prepare it.

Specimen B was peeled, cut into small pieces and ground using a mortar and pestle. A small amount of distilled water was added and the mixture stirred thoroughly. The mixture was filtered and the filtrate collected and labelled as Solution B.

(b) Use the reagents provided to identify the food substance(s) present in solutions B and R. Record your experimental results as shown in the following table.

Food tested	**Procedures**	**Observations**	**Inferences**
Starch	Add iodine solution to solution B	Blue-black colour appears	Starch present
Reducing sugar	Add Benedict's solution to solution R and heat in a boiling water bath	Colour changes from blue to brick-red	Reducing sugar present
Protein	Add Biuret reagent to solution R	Violet colour appears	Protein present

(c) (i) Explain the digestion process of the food substance(s) identified in solutions B and R from the beginning until the end product is formed.

Starch in solution B digestion starts in the mouth where salivary amylase breaks it down into maltose. In the small intestine, pancreatic amylase continues starch digestion into maltose which is later broken down by maltase into glucose. Protein in solution R digestion begins in the stomach where pepsin breaks it down into peptides. In the duodenum, trypsin further breaks down peptides into smaller peptides. In the ileum, peptidases break them down into amino acids. Reducing sugars require no digestion and are absorbed directly into the bloodstream in the ileum.

(ii) State the enzymes responsible for digestion of the food substance(s) identified in solutions B and R when reaches the small intestine.

For starch – pancreatic amylase and maltase.
For protein – trypsin and peptidase.

(d) State the function of each identified food substance(s) in solutions B and R to the human body.
Glucose provides energy for body metabolism.
Amino acids are used for growth, repair and synthesis of body tissues.

(e) Briefly explain the function of the following actions in the experiment:
(i) Boiling – to provide heat energy needed to activate Benedict's reagent in reducing sugar test.
(ii) Cooling – to prevent overheating and destruction of the results after the reaction has taken place.

2. You have been provided with specimens S_1, S_2 and S_3. Observe them carefully, then answer the following questions:

(a) List two observable features used to place specimens S_1 and S_2 under their respective Phyla.
They have bilateral symmetry.
They have segmented bodies.

(b) Use the hand lens and the forceps to carefully observe the specimens S_1 and S_2 and S_3, then identify the structure responsible for the following:
(i) Feeding – mouth parts.
(ii) Sensitivity – antennae.
(iii) Locomotion – jointed legs/wings.

(c) Use the hand lens provided to observe specimen S_1:
(i) State two features of the Class in which the specimen belongs.
It has three body regions: head, thorax and abdomen.
It has three pairs of jointed legs.

(ii) Identify three adaptive features of the specimen in its habitat.
It has compound eyes to detect movement and light.
It has wings for flight to escape predators and search for food.
It has strong legs adapted for jumping or running.

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(iii) Explain two importance of the specimen.

It acts as a food source for birds, reptiles and other animals.

It helps in pollination of crops and recycling of nutrients.

(d) Draw a diagram of specimen S_3 and label four parts.

diagram showing body divisions: head, thorax, abdomen, and appendages like legs or wings.

(e) Briefly explain two importance of the specimens S_1, S_2 and S_3 in the ecosystem.

They help in pollination of plants.

They act as food chains links by serving as prey for larger organisms.

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