THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

033/2B **BIOLOGY 2B**

(ACTUAL PRACTICAL 2B)

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).

1. You have been provided with solution E, specimen K, chemical reagents and the required apparatuses. Carefully use them to carry out experimental work, and then respond to the following questions.

(a) Prepare a solution from specimen K and label it as solution K. Outline the procedure you used to prepare the solution.

Specimen K was peeled, cut into small pieces, and ground using a mortar and pestle. Distilled water was added to the ground specimen and the mixture was filtered to obtain a clear solution. The filtrate was labelled as solution K.

(b) Mix solution E and solution K into one beaker to obtain solution EK, then use the chemical reagents provided to identify the carbohydrates present in the mixture. Record your experimental results as shown in the following Table.

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

(c) List the part(s) of the alimentary canal where digestion process of the food substance(s) identified in solution EK starts until the end product is formed.

Starch digestion starts in the mouth, continues in the duodenum and ileum. Reducing sugars are absorbed in the ileum.

(d) State the enzymes responsible for digestion of the food in each part you mentioned in (c).

In the mouth, amylase in saliva breaks down starch into maltose. In the duodenum, pancreatic amylase continues starch digestion. In the ileum, maltase, sucrase and lactase convert disaccharides into glucose, fructose and galactose.

(e) State the function of the identified food substance(s) to the human body.
Glucose provides energy required for cellular activities. Starch serves as an energy reserve which is eventually converted to glucose.

(f) Briefly explain the significance of the following chemical reagents in the procedures you have conducted:
(i) Dilute hydrochloric acid – breaks down complex carbohydrates into simpler sugars before testing.
(ii) Sodium hydroxide – creates an alkaline medium necessary for some food tests, such as the Biuret test for proteins.

2. Study specimens A, B, C and D then answer the following questions:

(a) Carefully observe specimens A and B:
(i) Identify specimens A and B using their common names.
Specimen A – Maize plant, Specimen B – Bean plant.

(ii) Why scientists do not prefer to use common names in identifying specimens A and B?
Because common names vary from one region to another and may cause confusion, while scientific names are universal.

(iii) Use two points to differentiate specimen A from specimen B.
Specimen A (maize) has parallel venation while specimen B (bean) has reticulate venation.
Specimen A has fibrous roots while specimen B has a tap root system.

(iv) Outline four characteristic features used to place the specimens A and B into the same division.
Both have flowers.
Both produce seeds enclosed in fruits.
Both show alternation of generations with dominant sporophyte stage.
Both have vascular tissues (xylem and phloem).

(v) State three adaptive features shown by specimens A and B to terrestrial environment.
Presence of roots for anchorage and absorption of water.
Presence of cuticle to reduce water loss.
Stomata for gaseous exchange and transpiration.

(vi) Briefly explain three importance of specimen A to human being.

Maize provides food as a staple diet.

It is used as livestock feed.

It is used as raw material in industries (flour, oil, ethanol production).

(b) Closely observe specimens C and D:

(i) Identify specimens C and D by using their common name.

Specimen C – Mushroom, Specimen D – Fern.

(ii) Classify specimens C and D to division level.

Specimen C – Fungi, Division Basidiomycota.

Specimen D – Plantae, Division Pteridophyta.

(iii) Explain three importance of specimen C to human being.

Mushrooms are used as food.

They are used in medicine and production of antibiotics like penicillin.

They help in decomposition and recycling of nutrients in the ecosystem.

(iv) Briefly explain three disadvantages of other members belonging to the same kingdom with specimen C to human being.

Some fungi cause diseases like athlete's foot and ringworm.

Some cause food spoilage.

Some produce poisonous toxins harmful to humans and animals.

(v) Identify three adaptive features shown by specimen D to its environment.

Has spores for reproduction instead of seeds.

Has vascular tissues for transport of water and nutrients.

Has fronds with cuticle to reduce water loss.

(vi) What are the three observable features shown by specimen D which place it under its division?

It reproduces by spores.

It has vascular tissues.

It has true roots, stems, and leaves but lacks flowers and seeds.