THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
DIPLOMA IN SECONDARY EDUCATTION EXAMINATION

733/2A **BIOLOGY 2A**

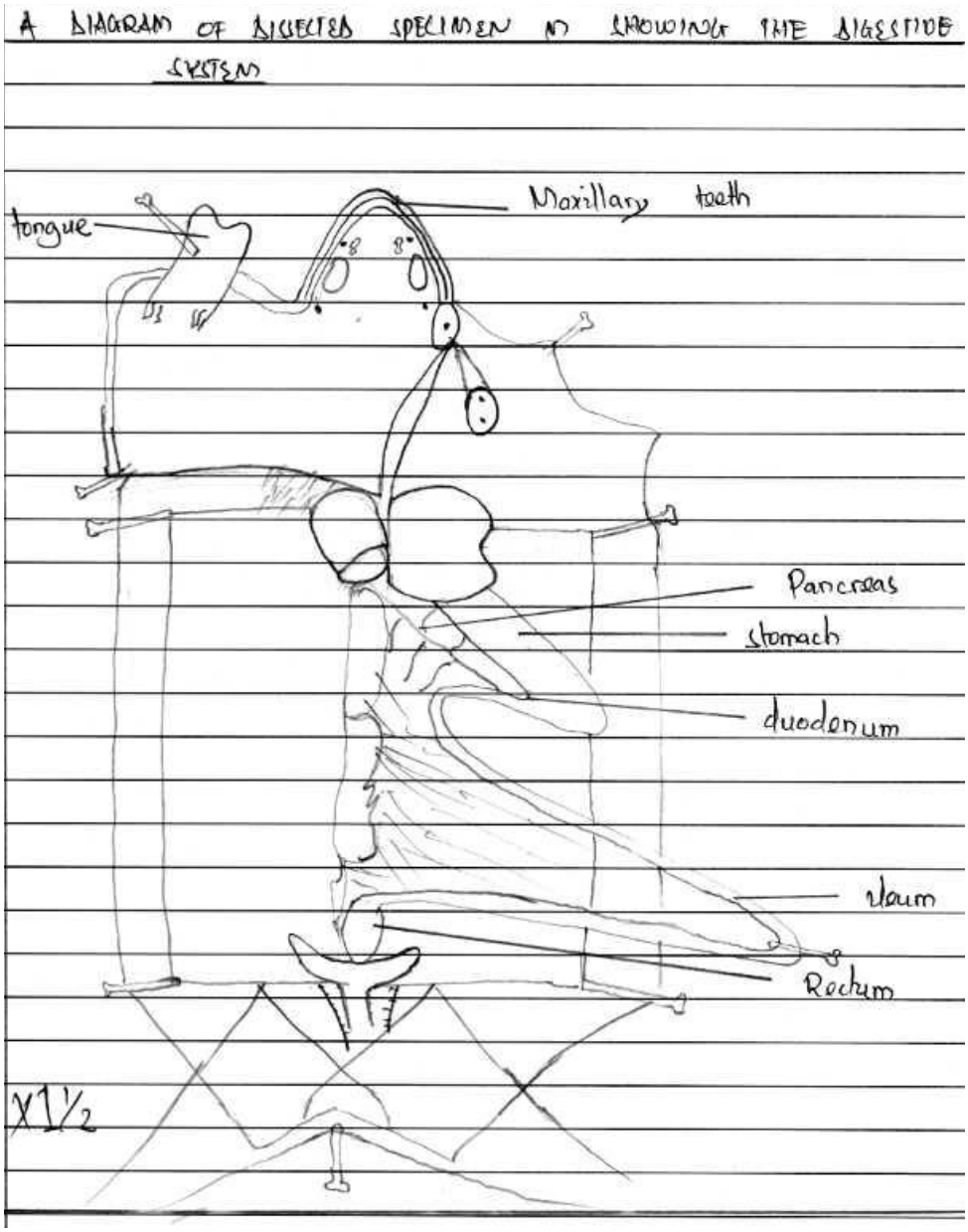
Time: 3 Hours **ANSWERS** **Year: 2023**

Instructions.

1. This paper consists of **three (3)** questions
2. Answer **all** questions.
3. Question **one (1)** carries **twenty (20)** marks and the remaining carry **fifteen (15)** marks each.
4. Cellular phones are **note** allowed in the examination room.
5. Write your **examination Number** on every page of your answer booklet(s).

1. Dissect the provided specimen M in the usual way and display the digestive system.
Deflect the alimentary canal to the left-hand side of the specimen and respond to the following questions: -

(a) Draw a diagram of the dissected specimen M and label seven parts concerned with digestion.



(b) Which precautions did you take when opening the inner skin? Give two points.

- Tie the blood muscle in two positions
  This is in order to avoid flow of blood during dissection
- Cut vertically first to the specimen in order to avoid destruction of inner parts of the specimen.

2. You are provided with solution **R.**

(a) Using the provided reagents, carry out the biochemical test to identify food substances contained in solution R. Tabulate your result as shown in the following table: -

Food Tested	Procedure	Observation	Inference

(b) State the role of each of the food substances identified in solution R to human body.

(c) Why was heat required during the testing of food substance identified in solution R?

Answers:

(a) Table of result.

Food Tested	Procedure	Observation	Inference
Starch	To 2cm3 of solutions **R** in the test tubes, two (2) drops of Iodine solution were added and the content was gently shaken.	Solution **R** was retained with the brown colour of the reagent.	Starch was absent in solution **R**.
Reducing sugar	To 2 cm^3 of solutions **R** in the test tubes, cm^3 of Benedict's solution was added and the content was boiled.	Solution **R** in the test tube turned into a series of colour from blue, green, yellow, orange to brick red precipitate.	Reducing sugar was present in solution R
Protein	To 2cm^3 of solutions **R** in the test tubes, 2cm3 of dilute NaOH solution was added followed by 2 drops of 1% CuSO4 solution while shaking.	Solution **R** in the test tube turned into purple/violet coloration.	Protein was present in solution **R**.
Lipids	To 2cm^3 of solutions **R** in the test tube, 3 drops of Sudan III solution was added and the content was vigorously shaken left to settle for 2 minutes.	Solution **R** in the test tube formed a red ring at the top surface of the solution.	Lipid was present in solution **R**.

(b) State the role of each of the food substances identified in solution R to human body.

- **Reducing sugar** for energy production/release,
- **lipids for** insulation and energy release during cellular respiration
- **Protein** being responsible for various functions including growth, repair of worn-out cells and tissues, acting as structural materials like keratin in hair, nails, horns and hooves. Also,

protein can aid in body defence like antibodies and transportation of materials like haemoglobin for transportation of Oxygen.

(c) Why was heat required during the testing of food substance identified in solution R?

- **it was responsible for conversion /reduction of blue copper II contained in Benedict`s solution to brick red precipitate of copper I oxide by speeding the rate of reaction.**

3. You are provided with specimens A, B and C. Observe them and answer the following questions:

(a) (i) What are observable features used to place specimen A into its respective kingdom? Give two points.

(ii) In what ways is specimen A is successfully adopted to its habitat? Give three points.

(iii) How is specimen A important for industrial development. Give three points

(b) (i) Identify the name of the organism from which specimen B was taken.

(ii) How is the specimen B important to the organism from which it was taken? Give two points.

(b) What are the observable features used to place specimen C into its respective class*? Give three points.*

ANSWERS:

(a) (i) Observable features used to place specimen A (Sisal plant) into its respective kingdom (Plantae):

First, it has green leaves containing chlorophyll, which is a characteristic feature of plants as it allows photosynthesis to occur.

Second, it possesses a well-defined root, stem, and leaf structure, which are fundamental characteristics of members of the plant kingdom.

(ii) Ways in which specimen A is successfully adapted to its habitat:

One, the sisal plant has thick, fleshy, and fibrous leaves that reduce water loss through evaporation, making it well-suited to arid and semi-arid areas.

Two, its leaves are covered with a waxy cuticle that further minimizes water loss by acting as a barrier to water vapor escape.

Three, the plant has a deep and extensive root system that allows it to access water from deeper soil layers, helping it survive in dry environments.

(iii) Importance of specimen A (Sisal plant) for industrial development:

One, sisal fibers extracted from its leaves are used in making ropes, mats, sacks, and carpets, contributing to the textile and crafts industries.

Two, it provides raw materials for making twines and brushes, supporting manufacturing industries that rely on natural fibers.

Three, its by-products can be used in bio-gas production and as organic fertilizers, promoting environmentally friendly industrial processes.

(i) Name of the organism from which specimen B (Tilapia scale) was taken:
The specimen was taken from a fish called *Tilapia*.

(ii) Importance of specimen B (Tilapia scale) to the organism:
First, the scales provide physical protection against predators, parasites, and physical injuries in the aquatic environment.

Second, they help to reduce water resistance when the fish is swimming, allowing smooth and efficient movement through water.

(c) Observable features used to place specimen C (Groundnut seedling) into its respective class (Dicotyledonae):
One, the seedling possesses two seed leaves (cotyledons), which is a defining feature of dicot plants.

Two, the leaves show a network of branching veins, known as reticulate venation, which is typical of dicotyledonous plants.

Three, the seedling's root system initially develops a main taproot, a characteristic feature of dicots as opposed to fibrous roots found in monocots.