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

733/2A **BIOLOGY 2A**

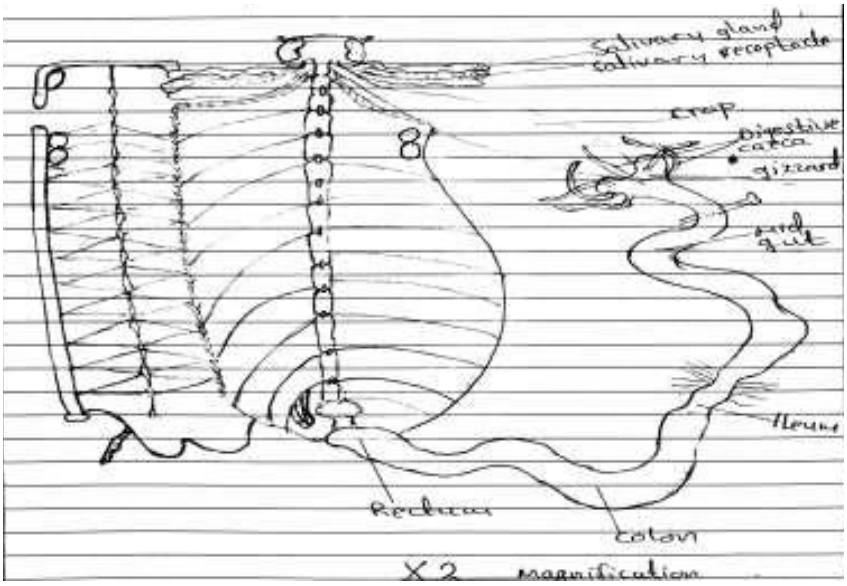
Time: 3 Hours **ANSWERS** **Year: 2021**

Instructions.

1. This paper consists of three questions.
2. Answer **all** questions.
3. Cellular phones are **note** allowed in the examination room.
4. Write your **examination Number** on every page of your answer booklet(s).

1. Dissect specimen X (a male or female Cockroach) in the usual way to display the digestive system. The candidates were supposed to deflect the gut to their right-hand side and respond to the following questions:

(a) Draw a large, neat, well-labelled diagram of your dissection.



(b) Give the role of each part of the digestive system labeled in (a).

- Mouthparts are used for cutting and chewing food.
- Oesophagus transports food from the mouth to the crop.
- Crop temporarily stores food before digestion.
- Gizzard grinds the food into smaller particles using chitinous plates.
- Midgut is where most digestion and absorption of nutrients occur.
- Malpighian tubules remove nitrogenous waste from the blood and empty it into the hindgut.
- Hindgut absorbs water and forms faeces.
- Rectum temporarily stores faeces before being expelled through the anus.

(c) Classify specimen X to the order level.

Order: Blattodea.

(d) Briefly describe four adaptations of specimen X to its mode of life.

- It has long, slender antennae for detecting food, mates, and danger in dark places.
- Possesses strong mandibles for chewing a wide range of food materials.
- Flattened body allows it to crawl into narrow spaces to escape predators and find shelter.

- Has well-developed compound eyes for wide-angle vision in low-light environments.

(e) State two advantages of specimen X in the ecosystem.

It aids in the decomposition process by feeding on decaying organic matter, thus recycling nutrients.

Serves as a food source for various predators such as birds, reptiles, and small mammals.

2. Extract food solution from raw food stuff labelled as specimen B (Ginger). The candidates were to label the prepared food solution as solution B and answer the following questions:

(a) State the procedures to be followed in preparing solution B from specimen B.

- Peel the ginger and wash it thoroughly using clean water.
- Grate or crush the ginger to break down its tissues.
- Add distilled water to the grated ginger and stir well.
- Filter the mixture using a sieve or filter paper to obtain the clear solution labeled as solution B.

(b) Design an experiment to find out the classes of carbohydrates contained in solution B. Tabulate your results as shown in the following table.

Test For	**Procedure**	**Observation**	**Inference**
Reducing sugars	Add Benedict's solution to solution B and heat in a water bath	Solution turns green/yellow/orange/red	Reducing sugars present
Non-reducing sugars	Boil solution B with dilute HCl, neutralize with sodium hydroxide, then add Benedict's solution and heat	Solution turns green/yellow/orange/red	Non-reducing sugars present
Starch	Add iodine solution to solution B	Blue-black coloration	Starch present

(c) State the role of food substance(s) identified in solution B in your body.

Carbohydrates provide the body with energy required for daily activities and maintain metabolic processes.

(d) What is the role of HCl in testing for carbohydrates?

HCl hydrolyzes non-reducing sugars like sucrose into reducing sugars like glucose and fructose, making them detectable by Benedict's solution.

3. Provided with specimen M, the (Hibiscus) flower, and then required them to:

(a) Carefully examine the specimen and then answer the following questions:

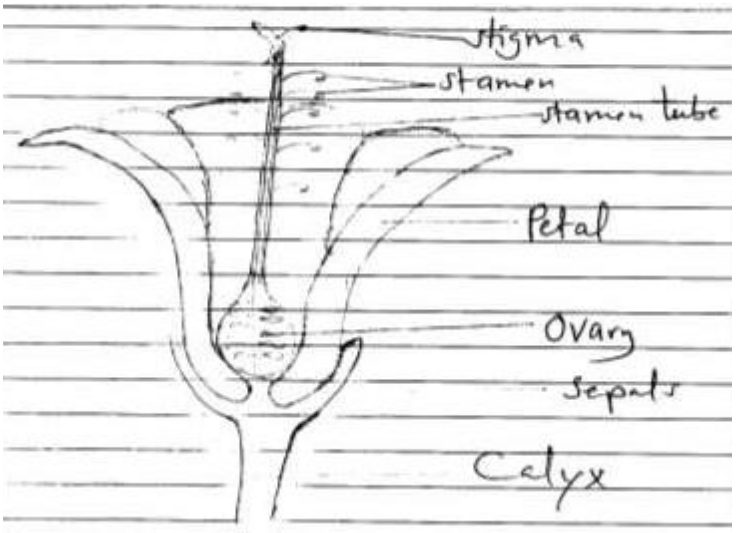
(i) Identify the specimen by its common name.

Hibiscus flower.

(ii) Classify the specimen to the Class level.

Class: Dicotyledonae.

(iii) Draw a well labelled floral diagram for the specimen.



(iv) Write a floral formula for the floral diagram you have drawn in 3(a)(iii).

Br, ⊕, K(5), C5, A(∞), G(5)

(b) By using a scalpel, cut the longitudinal section of specimen M. Take one part with the cut surface facing upwards. Observe it using a hand lens and then, draw a well labelled diagram showing internal and external parts of the specimen M.