THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

133/3C **BIOLOGY 3C**

ACTUAL PRACTICAL C

(For Both School and Private Candidates)

Time: 3:30 Hours **ANSWERS** **Year: 2025**

Instructions

1. This paper consists of **three (3)** questions.
2. Answer **all** questions.
3. Question **one (1)** carries **twenty (20)** marks and other **two (2)**, carries **fifteen (15)** marks each.
4. All writings should be in **blue** or **black** ink, **except** for drawings which must be drawn in pencil.
5. Communication devices and any unauthorised 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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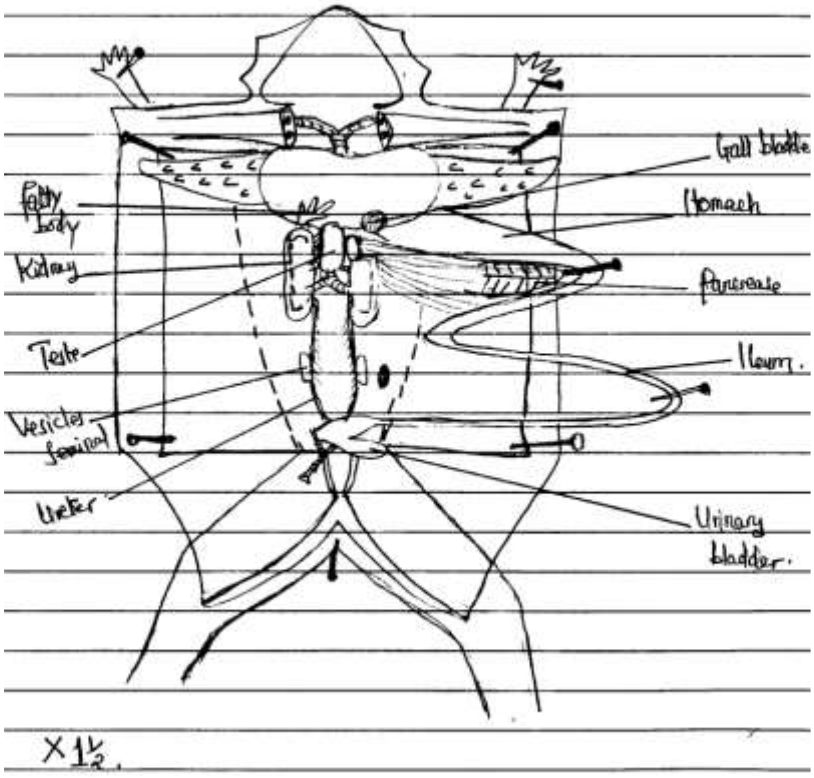
1. You have been provided with specimen R (Frog). Dissect it in a usual way to fully display the viscera general and pin the digestive system to your right-hand. Leave your dissection properly displayed for Assessment.

(a) Draw a neat diagram of the dissected specimen and label ten parts.



(b) Carefully observe the dissection and then provide one function of two parts which make up:

(i) the urinogenital system

The kidney filters metabolic wastes from the blood and forms urine, helping the frog maintain internal fluid balance.

The testes or ovaries produce gametes, ensuring reproduction and continuation of the frog's life cycle.

(ii) the digestive system

The stomach performs mechanical and chemical digestion by churning food and secreting enzymes and acid to break it down.

The small intestine absorbs digested nutrients into the bloodstream, supplying the frog with energy and essential materials for growth and movement.

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(c) Account for four features which enable specimen R to survive in its habitat.

The frog has a moist, thin skin that allows cutaneous respiration, helping it breathe efficiently both in water and on land.

It possesses powerful hind limbs that enable jumping and swimming, allowing rapid escape from predators and easy movement in aquatic environments.

The frog has well-developed eyes located on top of the head, giving it a wide field of vision to detect predators and prey while remaining mostly submerged.

It produces mucus on its skin to prevent dehydration and protect against external pathogens, helping it adapt to moist terrestrial habitats.

2. You have been provided with solution S_3 (mixture of starch and egg albumen) and solution S_4 (glucose).

(a) Identify the food substances present in solution S_3 and S_4 and prepare an experimental report in a tabular form using the format provided.

Food Tested	Procedure	Observation	Inference
S_3 (Starch + Egg albumen)	Add iodine solution to a portion of S3; add Biuret reagent to another portion of S3	Iodine turns blue-black; Biuret solution turns violet	Starch present; Protein present
S_4 (Glucose)	Add Benedict's solution and heat in boiling water bath	Solution changes from blue to brick-red	Reducing sugar (glucose) present

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(b) (i) Name the enzyme(s) responsible for the digestion of the food substance(s) identified in solution S_3.

Amylase is responsible for the digestion of starch into simple sugars.

Protease is responsible for the digestion of egg albumen protein into amino acids.

(b) (ii) Provide one environmental condition specific for the named enzyme(s) to work properly in digestion of the food substance(s) identified in solution S_3.

Amylase works best in a slightly alkaline medium, which allows it to break down starch efficiently in conditions similar to the small intestine.

Protease works properly in acidic conditions, such as those found in the stomach, where protein digestion begins effectively.

3. You have been provided with specimens M_1 (Maize grain), M_2 (Bean fruit) and M_3 (Female cone). Study them carefully and then answer the following questions:

(a) (i) Identify each of the specimens M_1, M_2 and M_3 by their common names.

Specimen M1 is identified as a maize seed or corn grain.

Specimen M2 is identified as a bean pod or bean fruit.

Specimen M3 is identified as a female cone.

(a) (ii) State from which part of a plant the specimens M_1 and M_2 develop, and give reasons to support the answer.

Specimen M1 develops from the fertilised ovary because the maize grain is a seed formed after pollination and fertilisation of the ovule inside the maize flower.

Specimen M2 develops from the entire ovary of a flower because a bean pod is a mature fruit that encloses seeds, indicating it originated from a fertilised ovary.

(b) (i) Give the name of the plants where specimens M_1, M_2 and M_3 are obtained.

Specimen **M_1** is obtained from the maize plant.

Specimen **M_2** is obtained from the bean plant.

Specimen **M_3** is obtained from a conifer plant such as a pine tree.

(b) (ii) Identify the Kingdom, Phylum/Division and Class in which each plant named in 3(b)(i) belongs.

The maize plant belongs to Kingdom Plantae, Division Angiospermophyta and Class Monocotyledonae.

The bean plant belongs to Kingdom Plantae, Division Angiospermophyta and Class Dicotyledonae.

The conifer plant belongs to Kingdom Plantae, Division Gymnospermophyta and Class Coniferopsida.

(c) State one observable feature which is the typical characteristic of the class to which each of the specimens M_1, M_2 and M_3 belongs.

Specimen **M_1** belongs to Monocotyledonae, and a typical observable feature is parallel leaf venation, which is common in monocots.

Specimen **M_2** belongs to Dicotyledonae, and its typical feature is reticulate or net-like venation, which is characteristic of dicots.

Specimen **M_3** belongs to Coniferopsida, and its typical feature is the presence of cones instead of flowers, which is unique to gymnosperms.

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