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 : 3:20 Hours **ANSWERS** **Year : 2021**

Instructions

1. This paper consists of three questions, answer all questions
2. All writing should be in **blue** or **black** ink.
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 are provided with specimen R1, dissect to fully display the excretory structures associated with the digestive system and deflect the digestive system to the right hand side.
   Questions
   (a) Draw a large diagram of the dissection and label the digestive system with the attached excretory structures.

The large diagram of specimen R1 (rat or small mammal) should include labelled parts such as mouth, esophagus, stomach, liver, pancreas, small intestine, large intestine, rectum, anus, kidneys, ureters, urinary bladder, and urethra.

(b) State three economic importance of the specimen.

Specimen R1 (rat) is economically important as it is used in biological and medical research.
It is a source of food for predators, thus maintaining the balance in ecosystems.
It is used in education as a specimen for dissection and practical lessons.

(c) Explain how the specimen is adapted to its mode of life by giving four points.

It has sharp incisors for gnawing food and defending itself.
It has fur for insulation and protection against harsh environmental conditions.
It has a long tail for balance during locomotion.
It has well-developed sense organs such as whiskers and ears for detecting danger and food.

2. You are provided with solution A1 which contained protein and glucose.
   (a) Use the chemicals and reagents provided only to identify the food substances present in solution A1 and record their experimental work as shown in Table 1.

Food tested	**Procedures**	**Observation**	**Inference**
Glucose (reducing sugar)	Add Benedict's solution and heat in a water bath	Brick-red precipitate formed	Glucose present

Protein	Add Biuret reagent	Violet/purple colour formed	Protein present

(b) (i) Mention a disease which develops when the diet provided to a child lacks one of the food identified in 2 (a).

Kwashiorkor develops when the diet lacks protein.

(ii) State four symptoms of the disease mentioned in 2(b)(i).

The child develops swollen belly (edema).
The child has stunted growth and poor muscle development.
The hair becomes thin, discoloured, and brittle.
The child has general weakness and frequent infections due to low immunity.

3. You are provided with specimens R2, B1, B2, B3 and B4.
   (a) Classify each of the specimen B1 and B2 to Class level.

Specimen B1 (grasshopper) belongs to Class Insecta.
Specimen B2 (earthworm) belongs to Class Oligochaeta.

(b) State three ways in which specimen B2 is important to the environment.

Specimen B2 (earthworm) improves soil fertility by decomposing organic matter.
It aerates the soil through burrowing, which enhances plant root growth.
It increases soil drainage and nutrient recycling.

(c) State the habitat of each of the specimens B1 and B2.

Specimen B1 (grasshopper) lives in terrestrial habitats such as grasslands and farms.
Specimen B2 (earthworm) lives in moist soil.

(d) Construct an indented key for identification of the specimens R2, B1, B2, B3 and B4 using the following features: (i) Nature of the skeleton (ii) Body segments (iii) Wings and (iv) Legs.

1a. Specimen with exoskeleton … go to 2
1b. Specimen without exoskeleton … go to 3

2a. Specimen with three body segments and wings … specimen B1 (insect)
2b. Specimen without wings … specimen B3

3a. Specimen with segmented body … specimen B2 (earthworm)
3b. Specimen without segmented body … go to 4

4a. Specimen with legs … specimen R2
4b. Specimen without legs … specimen B4