THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

133/3B **BIOLOGY 3B**

(ACTUAL PRACTICAL B)

(For Both School and Private Candidates)

Time : 3:20 Hours **ANSWERS** **Year : 2022**

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 N1. Dissect it and display the reproductive and digestive systems and pin the digestive system to the right hand side.
   Questions
   (a) Draw a neat diagram of the dissected specimen N1 and label twelve (12) parts.

The neat diagram of specimen N1 (a rat or small mammal) should show 12 labeled parts including: mouth, esophagus, stomach, liver, pancreas, small intestine, ileum, large intestine, caecum, anus, testes/ovaries, and uterus (if female) or sperm duct (if male).

(b) Explain the roles played by the labelled parts of the system in the digestion process by giving six points.

The mouth is responsible for ingestion and initial mechanical digestion by chewing.
The esophagus transports food from the mouth to the stomach through peristalsis.
The stomach secretes gastric juice containing enzymes and hydrochloric acid that chemically digest proteins.
The pancreas produces enzymes such as amylase, lipase, and proteases that are secreted into the small intestine.
The small intestine (particularly the ileum) absorbs digested nutrients into the bloodstream.
The large intestine reabsorbs water and compacts undigested food into feces for elimination.

2. You are provided with solution S2.
   Questions
   (a) Identify the food substances present in the solution S2 and tabulate the work as shown in the table below:

Food tested	**Procedures**	**Observation**	**Inference**
Reducing sugar	Add Benedict's solution and heat in water bath	Solution turns brick-red	Reducing sugar present

Starch	Add iodine solution	Blue-black coloration	Starch present
Protein	Add Biuret reagent	Violet/purple coloration	Protein present
Fat	Rub solution on filter paper, dry, observe	Translucent spot formed	Fat present

(b) State two properties of the food substance(s) identified in solution S2.

Reducing sugars are soluble in water and provide quick energy when metabolized.
Proteins are complex molecules made up of amino acids that are essential for growth and repair.

(c) State the food substances missing in solution S2 to make it a balanced diet.

The missing food substances are vitamins and mineral salts, which are essential for regulating body processes and maintaining health.

3. You are provided with specimens N2 and W:
   Questions
   (a) State the type of metamorphosis undergone by each of the specimens N2 and W.

Specimen N2 (grasshopper) undergoes incomplete metamorphosis.
Specimen W (butterfly) undergoes complete metamorphosis.

(b) Describe the developmental stages in the life cycles of the specimens N2 and W with the aid of diagram.

The life cycle of N2 (grasshopper) involves three stages: egg, nymph, and adult. The nymph resembles a small adult but lacks wings and reproductive organs, and it molts several times before becoming an adult.

The life cycle of W (butterfly) has four stages: egg, larva (caterpillar), pupa (chrysalis), and adult. The larva undergoes feeding and growth, then forms a pupa where metamorphosis occurs, finally emerging as a winged adult butterfly.

(c) State the advantage and disadvantage of specimen N2 in the ecosystem.

The advantage of N2 (grasshopper) is that it serves as food for many predators such as birds, reptiles, and small mammals, helping to maintain the balance of the food chain.

The disadvantage of N2 is that it can cause significant damage to crops by feeding on leaves and stems, leading to reduced agricultural yields.