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 : 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 S, dissect it and display the digestive system.
   Questions
   (a) Draw a large and well labelled diagram of the dissected specimen S.

The large diagram of specimen S (rat or small mammal) should show labeled parts such as mouth, esophagus, stomach, liver, pancreas, small intestine, ileum, caecum, large intestine, rectum, and anus.

(b) Mention two glands in the specimen S which carry out the digestive role.

The salivary glands secrete saliva containing amylase to digest starch.
The pancreas secretes pancreatic juice containing enzymes such as amylase, lipase, and proteases for digestion of carbohydrates, fats, and proteins.

(c) Briefly explain what would happen in the digestive system of the specimen S, if the glands mentioned in (b) were completely damaged.

If the salivary glands were damaged, the digestion of starch in the mouth would not begin, leading to slower carbohydrate digestion.
If the pancreas were damaged, there would be no secretion of pancreatic juice, resulting in poor digestion of starch, proteins, and fats, leading to malnutrition.

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

Specimen S has well developed incisors and molars that help in cutting and grinding food efficiently.
It has a long and coiled small intestine with villi to maximize surface area for absorption of nutrients.

(e) State two disadvantages of the specimen S to the Tanzania economy.

Specimen S (rat) destroys stored grains, leading to food loss.
It spreads diseases such as leptospirosis and plague, which affect human health and reduce productivity.

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2. You are provided with solutions X1 and Z1:

(a) Use the provided chemicals to identify the food substance(s) present in each of the solutions X1 and Z1 and record the experimental work as shown in Table 1.

Food tested	**Procedures**	**Observation**	**Inference**
Reducing sugar	Add Benedict's solution and heat in water bath	Solution turns brick-red	Reducing sugar present
Protein	Add Biuret reagent	Violet/purple coloration	Protein present

(b) State two properties of the food substance(s) identified in each of the solutions X1 and Z1.

Reducing sugars are soluble in water and provide immediate energy.
Proteins are complex macromolecules made of amino acids and are essential for body growth and repair.

(c) Give the importance of warmth in some procedures of the experiment.

Warmth provides the activation energy required for the reaction between the reagent and the food substance to take place quickly, ensuring observable results.

(d) State a way in which the food substance(s) identified in the solutions X1 and Z1 is important in the human body.

Reducing sugars provide energy necessary for body activities.
Proteins help in building and repairing body tissues as well as forming enzymes and hormones.

(e) Briefly explain how the knowledge applied in the experiment is useful in their daily life.

The knowledge helps in testing food items at home or in hospitals to determine their nutritional value. It is also applied in food industries to check the presence and quality of nutrients during food processing.

3. You are provided with specimens A, B, C, D, E, F and G.
   (a) Explain how each of the specimens F and G is adapted to its mode of life. Give three points for each.

Specimen F (moss) has rhizoids that attach it to surfaces and absorb water directly. It reproduces using spores which are adapted to dispersal. It can withstand desiccation by going dormant during dry conditions.

Specimen G (fern) has vascular tissues (xylem and phloem) for efficient transport of water and nutrients. Its fronds are large and divided to maximize photosynthesis. It reproduces by spores that are protected in sporangia located under the fronds.

(b) (i) Identify the Division/Phylum, Class and the Genus of each of the specimens F and G.

Specimen F (moss): Division Bryophyta, Class Bryopsida, Genus Hygrometrica.
Specimen G (fern): Division Pteridophyta, Class Filicopsida, Genus Filix.

(ii) Use binomial nomenclature rules to correctly write the specific names of each specimen if the specimens F and G belong to hygrometrica and filix-mas species respectively.

Specimen F: Hygrometrica hygrometrica.
Specimen G: Filix mas.

(c) Construct a bracketed key for identification of the specimens A, B, C, D and E using the following features:
(i) Backbone
(ii) Body shape
(iii) Fins
(iv) Limb size

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

2a. Body shape streamlined with fins … specimen C (fish)
2b. Body shape not streamlined with limbs … specimen D (frog)

3a. No limbs, elongated body … specimen A (worm)

3b. With limbs … go to 4

4a. Limb size small relative to body … specimen B (insect)

4b. Limb size large relative to body … specimen E (lizard)