THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

033/2A **BIOLOGY 2A**

(ACTUAL PRACTICAL A)

(For Both School and Private Candidates)

Time: 2:30 Hours **ANSWERS** **Year: 2019**

Instructions

1. This paper consists of two questions.

2. Answer all questions.

1. You have been provided with four test tubes labeled 1, 2, 3 and 4, a beaker, measuring cylinder, test tube rack, specimen M and the table reagents. Carry out experiments using procedures (i) - (viii), then answer the questions that follow:

(a) What was the aim of the experiment?
To test for the presence of food substances (starch, reducing sugars, proteins, and lipids) in specimen M using chemical reagents.

(b) Based on the observations in the test tubes 1, 2, 3 and 4, what are the types of food substances contained in the specimen M? Give reasons to justify your answer.
- Test tube 1: Presence of starch – iodine turned blue-black.
- Test tube 2: Presence of reducing sugar – Benedict's solution turned brick-red on warming.
- Test tube 3: Presence of protein – solution turned purple after adding sodium hydroxide and copper(II) sulfate.
- Test tube 4: Presence of lipids – Sudan III formed red-stained oil layer on the surface.

(c) Why warmth is important in procedure (vi) of the experiment?
Warming is necessary to activate the chemical reaction in Benedict's solution for detecting reducing sugars.

(d) Outline two importance of food substances identified in specimen M to the body of human being.
- Carbohydrates (starch, sugar) provide energy for metabolic processes.
- Proteins are used for growth, repair, and enzyme production.
- Lipids provide insulation, long-term energy storage, and form part of cell membranes.

(e) Why the skills used in this experiment useful for preparation of balanced diet in your daily life?
They help in identifying food types in different meals and ensuring proper intake of carbohydrates, proteins, and fats for body health and function.
2. You have been provided with specimens A, B, C and D. Study them carefully, then answer the following questions:

(a)(i) Classify each of the specimens A and B to the Phylum level:

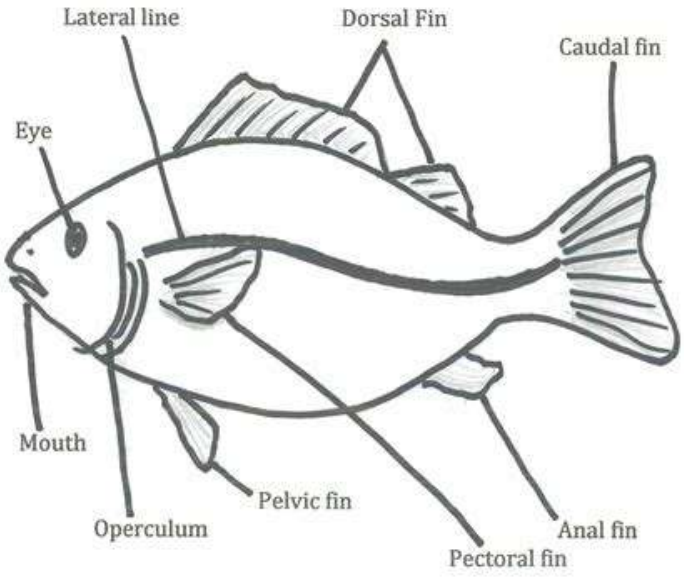
Specimen A:
- Kingdom: Animalia
- Phylum: Arthropoda

Specimen B:
- Kingdom: Animalia
- Phylum: Chordata

(ii) Why is it important to classify the specimens A and B to their respective Taxon? Give two reasons.
- It allows scientists to identify evolutionary relationships and biological similarities.
- It helps in organizing organisms for easier study, reference, and communication.

(b)(i) Identify the habitat of specimen B.
Aquatic (lives in water bodies such as rivers, lakes, or oceans).

(ii) Draw a diagram of specimen B and label the locomotive structures.



(iii) Why specimen B should be placed in the Class Osteichthyes?
- It has bony skeleton.
- It possesses gills covered by an operculum.
- It has scales and paired fins.

(c) Give two observable features which distinguish specimens C and D at Class level.
- Specimen C may have three body parts and six legs (Insecta) while specimen D may have two body parts and eight legs (Arachnida).
- Specimen C may have antennae and wings, while specimen D lacks antennae and wings.

(d) What are the advantages of members of the Class Insecta in the growth and development of industry? Give three points.
- Pollination of crops supports agriculture and food production.
- Some insects like silkworms are used in textile production.
- Bees produce honey and wax used in food and cosmetics industries.