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: 2009**

Instructions

1. This paper consists of two questions.

2. Answer all questions.

1.(a) You are provided with solution S_1. Carry out experiments to identify the food substances present in it. Record your procedure, observation and inferences as shown in the table below:

Test for: Starch
Procedure: Add iodine solution to solution S_1
Observation: Blue-black color appears
Inference: Starch is present

Test for: Reducing sugar
Procedure: Add Benedict's solution and heat in a water bath
Observation: Brick-red precipitate forms
Inference: Reducing sugar is present

Test for: Protein
Procedure: Add Biuret solution and shake gently
Observation: Purple color appears
Inference: Protein is present

Test for: Lipid
Procedure: Mix with ethanol, shake, and add water
Observation: Milky-white emulsion appears
Inference: Lipid is present

(b)
(i) Name the food substances you have identified.
Starch, reducing sugar, protein, lipid

(ii) State two sources of each food substance named in 1(b)(i) above.
Starch: Maize, potatoes
Reducing sugar: Honey, ripe bananas
Protein: Eggs, beans
Lipid: Groundnuts, sunflower seeds

(iii) Mention one role of each food substance you have identified.
Starch: Provides energy through glucose conversion
Reducing sugar: Quick energy source for metabolic processes
Protein: Supports growth and repair of body tissues
Lipid: Stores energy and insulates body organs

(c) In which parts of the digestive system are the above mentioned food substances digested? In each case mention the enzyme and the products.

Starch: Digested in the mouth and small intestine by salivary amylase and pancreatic amylase, producing maltose and glucose
Reducing sugar: Further broken down in the small intestine by maltase, sucrase, or lactase into glucose, fructose, or galactose
Protein: Digested in the stomach and small intestine by pepsin, trypsin, and peptidase enzymes into amino acids
Lipid: Digested in the small intestine by lipase enzyme into fatty acids and glycerol

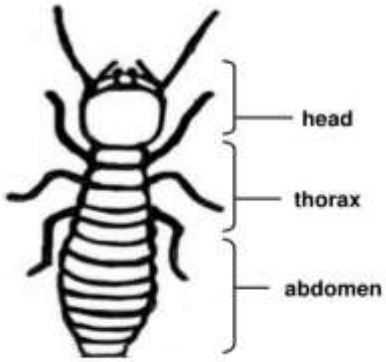
2. (a) Using a hand lens examine specimen A_1.

(i) Identify specimen A_1 by its common name.
Specimen A_1 is a termite.

(ii) Name the phylum and class to which specimen A_1 belongs.
Phylum: Arthropoda
Class: Insecta

(iii) Give an example of another organism which belongs to the same phylum as specimen A_1.
An example is a grasshopper.

(b) Draw a well labelled diagram of specimen A_1.



(c) How is specimen A_1 adapted to its mode of nutrition?
Termites have strong mandibles for chewing wood and cellulose material. Some have symbiotic protozoa or bacteria in their guts to help digest cellulose. Their social behavior helps them forage and share food within colonies.

(d) What is the economic importance of specimen A_1?
Termites decompose dead plant material, improving soil fertility. However, they are also destructive pests to wooden structures, crops, and books.

(e) Where can specimen A_1 be found?
Termites are found in moist underground soil, dead logs, decaying wood, or wooden buildings.