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: 2010**

Instructions

1. This paper consists of two questions.

2. Answer all questions.

1. You have been provided with solution T_1.

(a) Carry out food tests to identify the substances present in solution T_1. Record your work in a table as shown below:

Test for: Starch

Procedure: Add iodine solution to solution T_1

Observation: Blue-black color appears

Inference: Starch is present

Test for: Reducing sugars

Procedure: Add Benedict's solution and heat in a water bath

Observation: Brick-red precipitate forms

Inference: Reducing sugars are present

Test for: Proteins

Procedure: Add Biuret solution and shake gently

Observation: Purple/violet color appears

Inference: Proteins are present

Test for: Lipids

Procedure: Mix with ethanol, shake, then add water

Observation: Milky-white emulsion forms

Inference: Lipids are present

(b) What are the functions of the food substances identified in T_1 in the human body?

Starch provides long-term energy.

Reducing sugars offer quick energy for cellular functions.

Proteins support body growth, repair of tissues, and formation of enzymes and hormones.

Lipids store energy, provide insulation, and protect internal organs.

(c)(i) State the favourable/suitable pH condition at which the enzymes which digest the food substances present in T_1 work best.

Carbohydrate digestion enzymes (amylase) work best in slightly alkaline pH (~7.5).

Protein enzymes (pepsin) work best in acidic pH (~2), and trypsin in alkaline pH (~8).

Lipid digestion enzymes (lipase) work best in alkaline pH (~8).

(ii) Which of the food substances present in T_1 is not stored in the human body?

Reducing sugars like glucose are not stored directly but converted into glycogen or fat. Excess glucose is removed from the bloodstream.

(iii) What happens when the levels of this substance mentioned in (c)(ii) above, rises in the body?

When glucose levels rise excessively, it may lead to hyperglycemia and result in diabetes mellitus. This can cause frequent urination, fatigue, excessive thirst, and may lead to organ damage if uncontrolled.

2. You are provided with specimens A, B, C, D and E. Observe them carefully and answer the questions that follow:

(a) (i) Write down the common names of specimens A, B, C, D and E.

A: Mosquito

B: Housefly

C: Cockroach

D: Butterfly

E: Mushroom

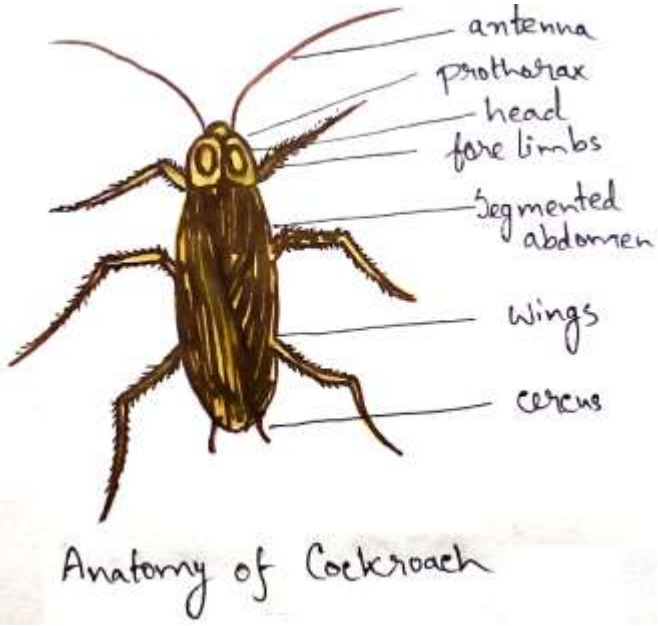
(ii) To which kingdom do specimens C and D belong?

Specimens C (cockroach) and D (butterfly) belong to Kingdom Animalia.

(iii) Name one common epidemic disease transmitted by specimen A.

Malaria is transmitted by specimen A (mosquito), specifically the female Anopheles mosquito.

(b) (i) Draw a large well labelled diagram of specimen C.



(ii) State the economic importance of specimen C.

Cockroaches are pests that contaminate food and utensils, carry disease-causing organisms, and damage books and clothing. However, in some research contexts, they are used to study insect physiology.

(c) (i) What are the distinguishing characteristics of the Phylum/Division to which specimen E belongs?

Specimen E (mushroom) belongs to Kingdom Fungi, Division Basidiomycota. They lack chlorophyll, reproduce using spores, feed saprophytically or parasitically, and consist of hyphae forming a mycelium.

(ii) Where can specimen E be found?

Mushrooms can be found in damp, decaying organic matter such as rotting wood, forest floors, compost heaps, or moist soils.