THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

733/2B **BIOLOGY 2B**

Time: 3 Hour. **ANSWERS** **Year: 2005**

Instructions

1. This paper has three papers.
2. Answer **all** questions.
3. Question **1** contains 30 marks while question 2 and 3 have 10 marks each.
4. Mobile phones are not allowed inside the examination room.
5. Write your Examination Number on every page of your answer booklet.

1. Dissect specimen Z (Frog/Toad) to expose the reproductive system.

(a) (i) Draw and label five reproductive structures.

(ii) Indicate the route gametes travel.

The diagram should include and label the following: testes or ovaries, oviduct or sperm duct, cloaca, and fat bodies. Arrows should show sperm moving from testes through sperm ducts to cloaca in males, or eggs moving from ovaries through oviducts to the cloaca in females.

(b) (i) Name the sex organs observed.

The sex organs in a male frog are the testes and sperm ducts. In a female, they are the ovaries and oviducts.

(ii) What are the functions of each identified structure?

Testes produce sperm while sperm ducts transport the sperm to the cloaca. Ovaries produce eggs and oviducts transport them to the cloaca. The cloaca acts as a common opening for reproductive and excretory systems.

(c) (i) List four physical features that indicate the sex.

In males, the presence of vocal sacs, thumb pads (nuptial pads), smaller body size, and visible testes during dissection. In females, larger body size, absence of vocal sacs, and visible ovaries with eggs.

(ii) State why care must be taken not to damage blood vessels during dissection.

Damaging blood vessels can cause excessive bleeding which obscures visibility of internal organs. It may also destroy key structures and prevent accurate identification of anatomical parts.

2. You are provided with solution A.

(a) (i) Carry out food tests and tabulate results.

Food Tested	Procedure	Observation	Inference
Starch	Add iodine solution	Blue-black coloration	Starch present
Reducing sugar	Add Benedict's, heat in water bath	Orange/red precipitate	Reducing sugar present
Protein	Add Biuret solution	Purple color	Protein present
Lipid	Add ethanol, shake, then add water	Milky/cloudy appearance	Lipid present

(b) (i) Name two likely food items solution A was derived from.

Possible sources include milk (contains proteins, sugar, and lipids) and groundnuts (rich in proteins and lipids).

(ii) Indicate first digestion site, juice involved, and final products.

Carbohydrates start digestion in the mouth by salivary amylase; proteins in the stomach by pepsin; lipids in the small intestine by pancreatic lipase. Final products are glucose, amino acids, and fatty acids with glycerol respectively.

(c) (i) Explain how enzymes function in digestion.

Enzymes break down complex food molecules into simpler, absorbable forms. They speed up chemical reactions by lowering the activation energy needed.

(ii) What factors affect enzyme activity?

Temperature and pH greatly influence enzyme activity. High temperatures may denature enzymes while each enzyme has an optimal pH at which it works best.

3. Observe specimens B (Bee), C (Butterfly), and D (Grasshopper).

(a) (i) Identify four features common to all three.

All possess jointed legs, segmented bodies divided into head, thorax, and abdomen, one pair of antennae, and an exoskeleton. They also have compound eyes and wings in the adult stage.

(ii) Mention two uses of specimen B to agriculture.

Bees aid in pollination, enhancing crop yields, and produce honey which is economically valuable.

(b) (i) List three external parts of specimen D.

Parts include antennae, hind legs (adapted for jumping), and compound eyes.

(ii) Draw specimen C and label five parts.

The diagram should include: head, thorax, abdomen, antennae, and wings (forewing and hindwing).