THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

733/2B **BIOLOGY 2B**

Time: 3 Hour. **ANSWERS** **Year: 2004**

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 M (Rat/Guinea pig) to display the reproductive system.

(a) Why should the specimen be anaesthetized before dissection?

Anaesthetizing the specimen is necessary to ensure it is fully unconscious to prevent pain and movement. It reduces suffering and follows ethical guidelines in animal handling. It also helps in obtaining a relaxed body for easier and more accurate dissection.

(b) Draw a diagram of the dissected specimen M and label five parts that form the reproductive system.

The diagram should include structures such as testes/ovaries, sperm ducts/oviducts, uterus or penis, scrotal sac (if male), and vagina or urethra (depending on the sex).

(c) What is the sex of specimen M? Give four reasons.

If male, the presence of testes located in the scrotal sacs, presence of penis, absence of uterus and ovaries, and smaller distance between anus and genital opening. If female, presence of ovaries and uterus, absence of scrotum, presence of teats or nipples, and shorter space between anus and genital opening.

2. You are provided with solution T (Sucrose solution).

(a) Using the reagents provided, carry out food tests. Tabulate your results:

Test For	Procedure	Observation	Inference
Reducing sugar	Add Benedict's and heat in water bath	No color change	Reducing sugar absent
Non-reducing sugar	Add HCl, boil, neutralize with NaOH, then Benedict's test	Orange-red precipitate	Non-reducing sugar present
Starch	Add iodine solution	No blue-black color	Starch absent
Protein	Add Biuret reagent	No purple color	Protein absent
Lipid	Add ethanol, shake, add water	No emulsion	Lipid absent

(b) Identify two natural foodstuffs from which solution T could have been extracted.

Possible sources include sugarcane and sweet fruits such as pineapples or mangoes which contain high amounts of sucrose.

(c) State the first site of digestion, the digestive juice, and the product of digestion of the food substances identified in solution T.

The first site of digestion of sucrose is the small intestine. The digestive juice is intestinal juice which contains the enzyme sucrase. The end products of digestion are glucose and fructose.

3. Observe the provided specimens V (Crab), W (Mushroom), and Y (Bee).

(a) In what ways is specimen Y useful to human beings? Give two points.

The bee is important for pollination of flowering plants which increases crop production. It also produces honey, a valuable source of food and medicine.

(b) Why is specimen Y placed in the class Insecta? Give three reasons.

It has three main body parts: head, thorax, and abdomen. It possesses three pairs of legs, one pair of antennae, and usually two pairs of wings, which are all typical characteristics of insects.

(c) Using three observable features, differentiate between specimen V and Y.

Specimen V (crab) has two main body parts (cephalothorax and abdomen), has compound eyes on stalks, and five pairs of walking legs including pincers. Specimen Y (bee) has three body parts, compound eyes not on stalks, and three pairs of legs.

(d) Draw specimen W (Mushroom) and label three parts.

The drawing should include: cap (pileus), stalk (stipe), and gills (lamellae) under the cap.