THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

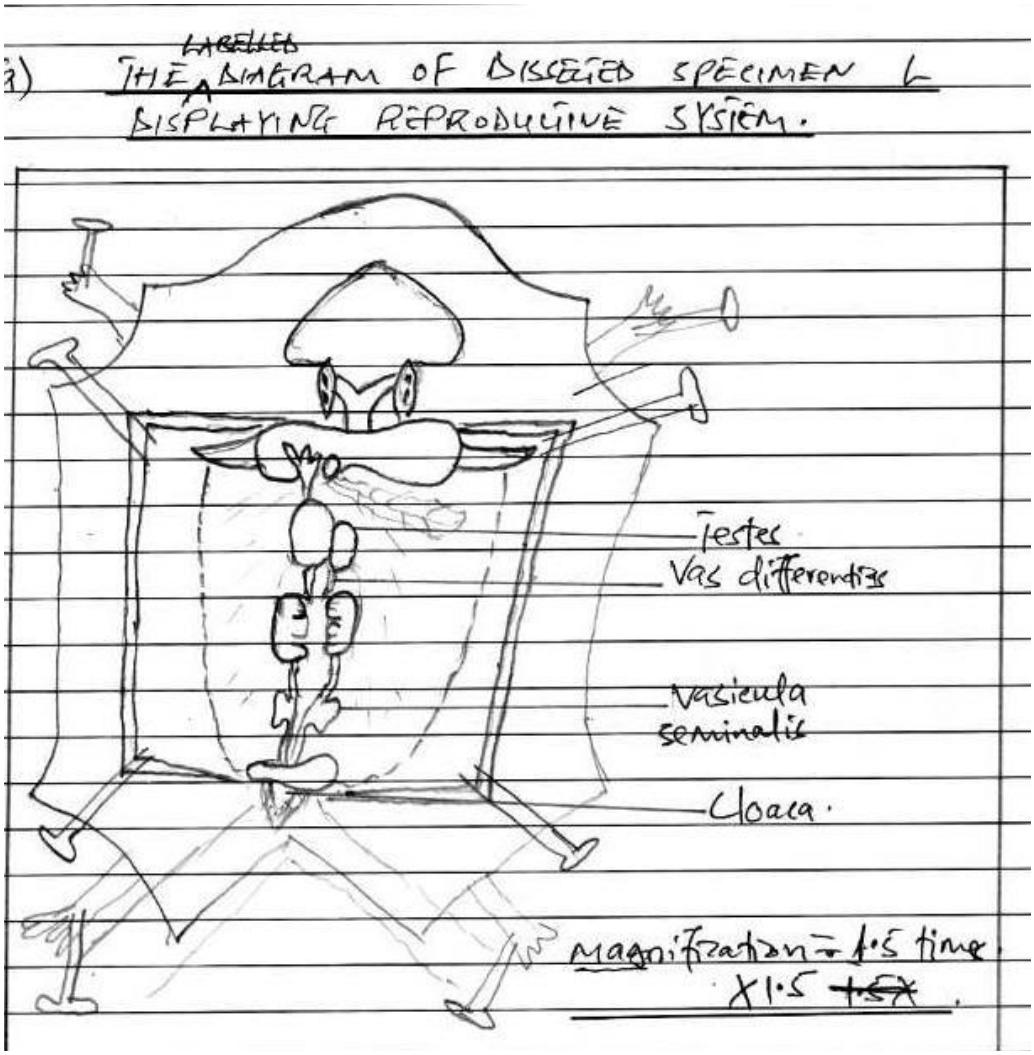
733/2B **BIOLOGY 2B**

Time: 3 Hour. **ANSWERS** **Year: 2009**

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 (toad) to expose reproductive organs.**
   (a) Draw a labelled diagram showing five reproductive parts.



(b) State sex of M and give four reasons.
The presence of testes and sperm ducts indicates the specimen is male.
Males typically have thicker forelimbs for clasping during mating (amplexus).
The absence of oviducts and ovaries further confirms the male sex.
Males may also have vocal sacs used during mating calls, visible as pouches near the throat region.

(c) Why should anaesthesia be used before dissection?
Anaesthesia is used to reduce pain and stress to the specimen, ensuring ethical handling.
It also immobilizes the animal, making it easier and safer to perform a clean and precise dissection without unnecessary movement.

2. You are provided with solution R (Sucrose).
(a) Conduct food tests and complete the table:

Test For	Procedure	Observation	Inference
Reducing sugar	Add Benedict's and heat in water bath	No colour change	No reducing sugar present
Non-reducing sugar	Boil with dilute HCl, cool, add $NaHCO_3$, then Benedict's and heat	Brick-red precipitate	Non-reducing sugar (sucrose) present
Starch	Add iodine solution	No blue-black colour	Starch not present
Protein	Add Biuret solution	No purple colour	Protein not present
Lipid	Rub on brown paper, observe after drying	No translucent spot	Lipid not present

(b) Name two natural food sources of solution R.
Solution R could have been obtained from sugarcane juice, which is rich in sucrose.
It could also be extracted from fruits like pineapples or mangoes, which have natural sucrose content.

(c) Identify:
(i) First site of digestion
The first site of sucrose digestion is the small intestine, as it bypasses digestion in the mouth.

(ii) Digestive juice
The digestive juice is intestinal juice, which contains the enzyme sucrase (invertase).

(iii) End product of digestion
Sucrose is broken down into glucose and fructose by the action of sucrase enzyme.

3. Observe specimens S (Crab), T (Bee), U (Mushroom).
(a) Give two ways specimen T is important to humans.
Bees aid in pollination, which supports crop production and food security.
They produce honey, which is used as food and in traditional medicine.

(b) List three features placing T in Class Insecta.
Specimen T has three body segments: head, thorax, and abdomen.
It has one pair of antennae and compound eyes.
It bears three pairs of jointed legs, a key characteristic of insects.

(c) Use three features to differentiate S and T.

Specimen S (crab) has two main body parts (cephalothorax and abdomen), while specimen T has three.
Specimen S has four pairs of walking legs and a pair of claws, while T has three pairs of walking legs.
S breathes through gills, while T breathes through spiracles connected to tracheae.

(d) Draw specimen U and label three parts.