THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
DIPLOMA IN SECONDARY EDUCATTION EXAMINATION

733/2B **BIOLOGY 2 B**

Time: 3 Hours **ANSWERS** **Year: 2022**

Instructions.

1. This paper consists **three (3)** questions
2. Answer **all** questions.
3. Cellular phones are **note** allowed in the examination room.
4. Write your **examination Number** on every page of your answer booklet(s).

1. Dissect the provided specimen T (a male or female Rat/Guinea pig) in the usual way to display the reproductive system and respond to the following questions:

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

The specimen should be anaesthetized before dissection to minimize its pain and distress, ensuring the dissection process is humane. Additionally, it helps to keep the animal still during the procedure, preventing muscle movement or reflexes that could interfere with accurate dissection and observation of internal organs. In educational dissections, however, most specimens are preserved or already euthanized.

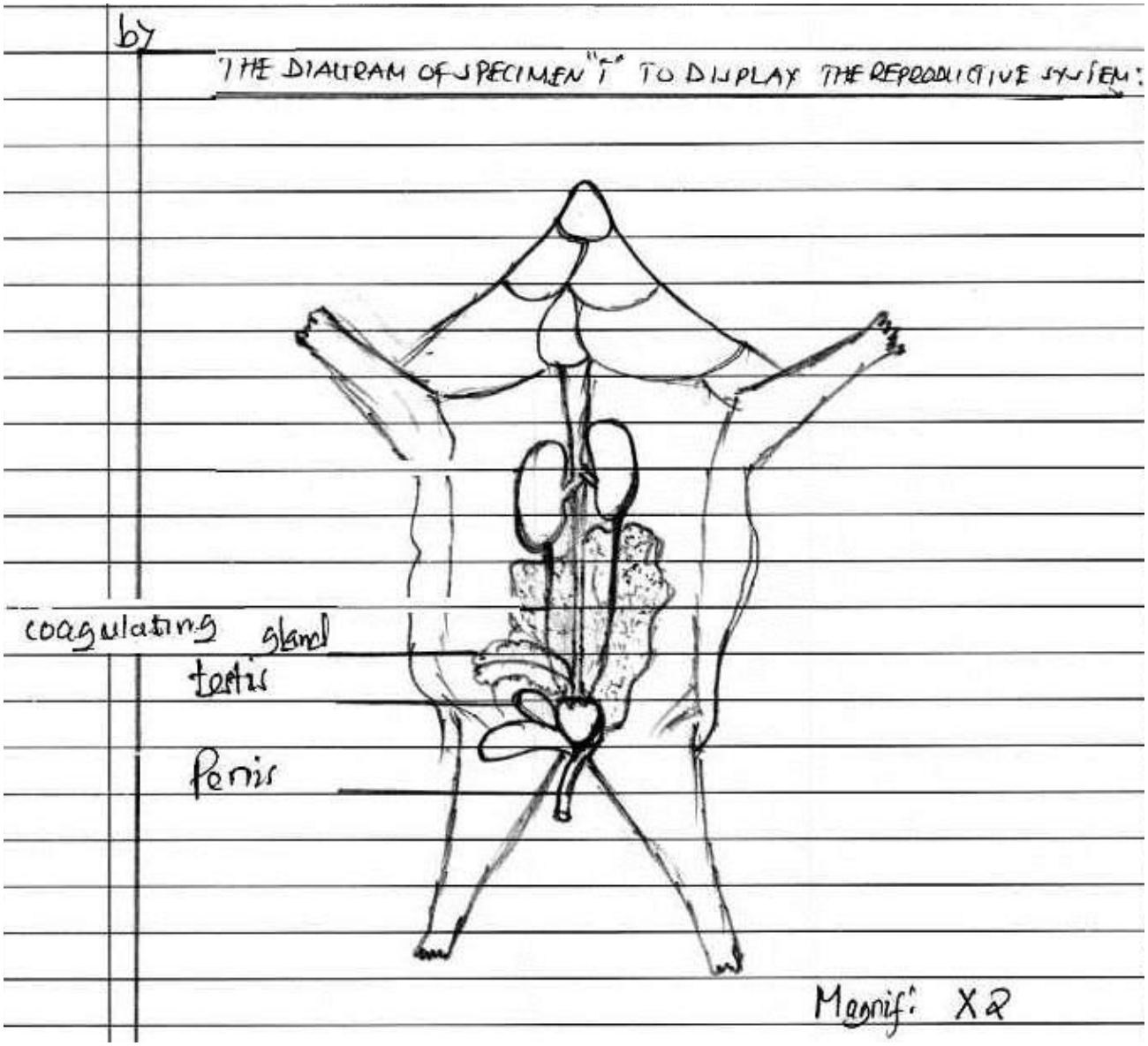
(b) Draw a diagram of the dissected specimen T and label five parts that form the reproductive system.

In a drawn diagram of a dissected male rat or guinea pig, the labelled parts would include:

- Testes
- Sperm ducts (vas deferens)
- Penis
- Seminal vesicles
- Prostate gland

In a female:

- Ovaries
- Fallopian tubes (oviducts)
- Uterus
- Vagina
- Mammary glands



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

The sex of specimen T can be determined based on anatomical and external features. If it is male, there will be visible testes located within the scrotal sacs, posterior to the penis. The penis is present and extends anteriorly from the ventral body surface. Internally, dissection would reveal paired testes connected to sperm ducts and accessory glands like seminal vesicles and prostate gland. The absence of ovaries and a uterus also confirms a male.

If female, there would be two small, oval ovaries near the kidneys, connected by fallopian tubes to a Y-shaped uterus. The absence of testes and penis, and the presence of a visible vaginal opening, would confirm a female. Additionally, mammary glands would be better developed and visible in females.

2. Provided the candidates were with solution U (Sucrose solution) and required them to answer the following questions:

(a) Using the reagents provided, carry out the biochemical test to identify food substance(s) contained in solution U. Tabulate your results, as shown in the following table:

Test For	Procedure	Observation	Inference
Reducing sugar (Benedict's test)	Add Benedict's solution and heat	No color change	No reducing sugar
Non-reducing sugar (Sucrose test)	Boil with dilute acid, neutralize with sodium hydroxide, add Benedict's and heat	Solution turns brick-red	Non-reducing sugar (sucrose) present

(b) Identify two natural food stuffs from which solution U could have been extracted from.

Solution U, being a sucrose solution, could have been extracted from sugarcane and sugar beet. Both are rich natural sources of sucrose commonly used in the production of table sugar and syrups.

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

The first site of sucrose digestion in the human body is the small intestine. The digestive juice involved is intestinal juice, specifically containing the enzyme sucrase (invertase). The product of sucrose digestion is glucose and fructose, which are absorbed through the intestinal walls into the bloodstream.

3. Required the candidates to observe the provided specimens V (Crab), W (Mushroom) and Y (Bee) and then answer the following questions:

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

Specimen Y, the bee, is highly useful to humans through its role in pollination, which is vital for the reproduction of many crops and flowering plants, improving agricultural productivity and biodiversity. Additionally, bees produce honey, which is consumed as food and used for medicinal and cosmetic purposes.

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

Specimen Y is placed in Class Insecta because it has a body divided into three main parts: head, thorax, and abdomen. It also possesses three pairs of jointed legs, one pair attached to each thoracic segment. Furthermore, the presence of one or two pairs of wings and a pair of compound eyes confirms its classification in Insecta.

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

Specimen V, the crab, belongs to Class Crustacea, while specimen Y belongs to Class Insecta. The crab has two body parts: cephalothorax and abdomen, while the bee has three: head, thorax, and abdomen. The crab possesses five pairs of legs, with the first pair modified into pincers, whereas the bee has three pairs of legs and one or two pairs of wings. The crab has compound eyes on stalks, while the bee's compound eyes are directly attached to the head.

(d) Draw specimen W and label three parts.

The diagram would show a typical mushroom with:

- Cap (pileus)
- Stalk (stipe)
- Gills (lamellae) under the cap

These parts would be labelled clearly in a vertical section diagram of the mushroom.