THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

733/2B **BIOLOGY 2B**

Time: 3 Hour. **ANSWERS** **Year: 2000**

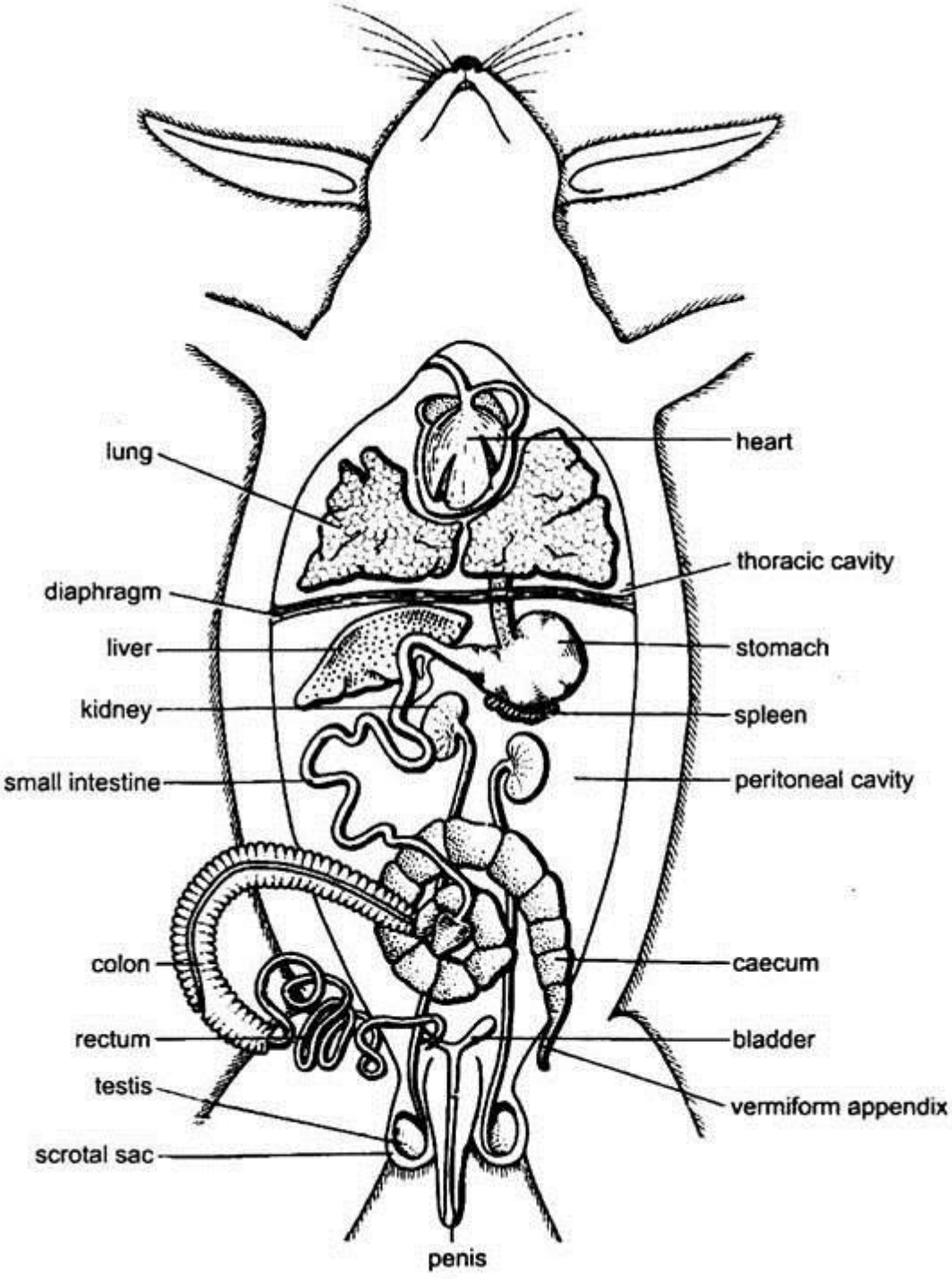
Instructions

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 the provided specimen Y (a male or female rabbit) to expose the reproductive system.

(a) Draw a well-labelled diagram of the reproductive system showing five parts.

(This should be drawn practically. In a male rabbit: label testes, epididymis, vas deferens, prostate gland, and penis. In a female rabbit: label ovary, oviduct, uterus, cervix, and vagina.)



(b) Determine the sex of specimen Y. Give four justifications based on your observation.

If testes are found externally in scrotal sacs near the hind limbs, the specimen is male. These structures are absent in females.

In males, a penis can be identified near the urogenital opening. It may be retracted but can be observed upon careful examination.

A female specimen has a uterus, which is a Y-shaped organ leading to two ovaries at the end of each uterine horn. This feature is absent in males.

The female has a visible vaginal opening separate from the anus, whereas in males the urethral and reproductive tracts open through the penis.

(c) Why is it important to stun or anaesthetize a specimen before dissection?

Stunning or anaesthetizing the specimen ensures the animal is unconscious or dead before dissection, which prevents unnecessary suffering and adheres to ethical treatment standards.

It also reduces sudden movements, making the dissection safer and more effective for both the student and the integrity of the specimen's internal organs.

2. You are provided with solution Z (a solution of milk). Use the reagents provided to perform food tests.

(a) Complete the biochemical test and tabulate your findings below:

Food Tested | *Procedure* | *Observation* | *Inference*
Reducing sugar | Add Benedict's solution and heat | Light brick-red precipitate | Lactose (a reducing sugar) present
Protein | Add Biuret reagent | Purple colour appears | Protein (casein) present
Lipid | Rub solution on brown paper, dry over flame | Permanent translucent spot | Lipid present

(b) Name two natural food sources from which solution Z might have been obtained.

Solution Z could have been obtained from cow's milk, which contains lactose, casein, and milk fat.

It could also be goat milk, which has similar nutritional composition including proteins, fats, and sugars.

(c) State the first site of digestion, the digestive juice involved, and the end product of the food substance tested from solution Z.

Carbohydrate digestion begins in the mouth with saliva, where salivary amylase starts breaking down lactose partially.

Protein digestion begins in the stomach with the action of gastric juice containing pepsin, which breaks down casein into peptides.

Lipid digestion begins in the small intestine with bile (from the liver) emulsifying the fat and lipase breaking it down into fatty acids and glycerol.

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3. Observe the provided specimens: A (Scorpion), B (Mite), C (Housefly), D (Groundnut seedling), and E (Fungus). Then respond to the following:

(a) What are four observable differences between specimen A and B?

The scorpion has a large segmented tail with a stinger, while the mite lacks a visible tail structure.

Scorpions have large pincers (pedipalps) for grasping, while mites do not have these and instead have small front appendages.

Scorpions are generally larger and have a well-defined segmented body, while mites are very small with a less clearly segmented appearance.

Mites often have fused cephalothorax and abdomen, whereas in scorpions the segmentation is more distinct.

(b) Give two reasons why specimen C is placed under Class Insecta.

The housefly has three distinct body regions: head, thorax, and abdomen, which is typical of insects.

It possesses three pairs of legs attached to the thorax, and compound eyes and antennae on the head.

(c) List three adaptive features of specimen D that enable it to grow in sandy soil.

The groundnut has a deep taproot system that allows it to access water stored deep in sandy soils.

It has lateral roots that spread out and help anchor the plant in loose, dry soil and absorb moisture across a wide area.

Its leaves may have a waxy coating to reduce water loss, which is helpful in dry sandy environments.