THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

133/3A **BIOLOGY 3A**

(ACTUAL PRACTICAL A)

(For Both School and Private Candidates)

Time: 2:30 Hours **ANSWERS** **Year: 2001**

Instructions

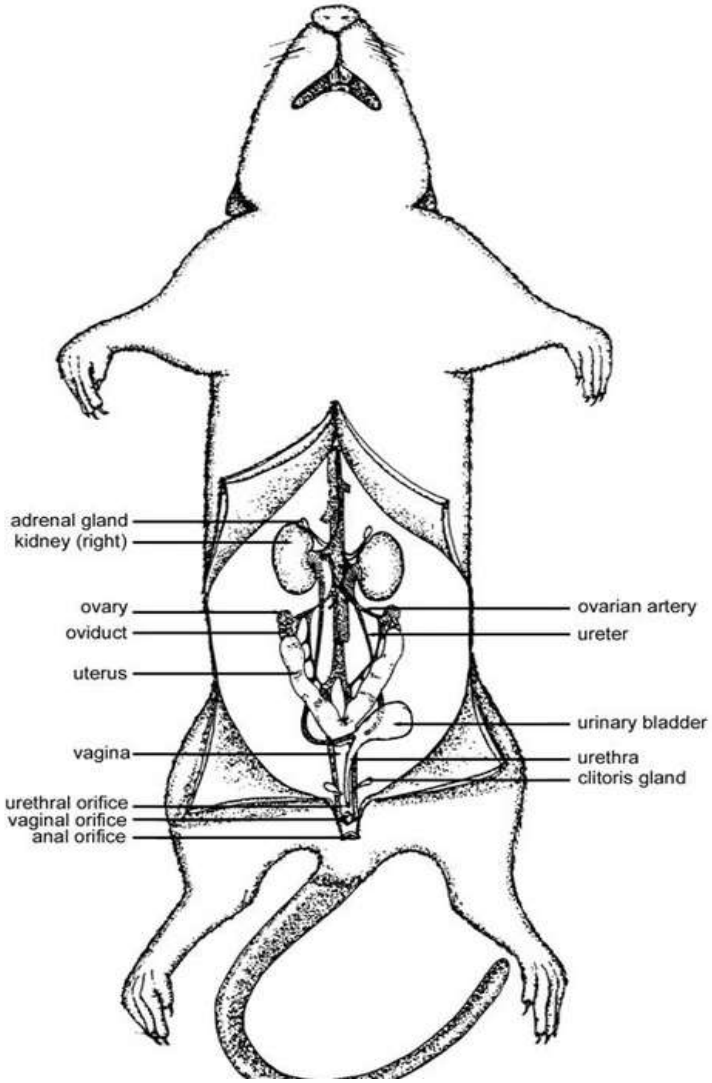
1. This paper consists of three questions.

2. Answer all questions.

1. You have been provided with specimen S_1.

(a) Identify the sex of your specimen.
Dissect specimen S_1 in the usual way to fully display the EXCRETORY SYSTEM.

(b) Draw a large, neat diagram of your dissection and label only the excretory structures and blood vessels associated with the system.



(c) State one function of any four of the excretory structures labelled in (b) above.

Kidney -----> Filters urea and other wastes from the blood
Ureter -----> Carries urine from kidney to bladder
Bladder -----> Stores urine

Renal artery -----> Brings oxygenated, unfiltered blood to kidney

(d) LEAVE YOUR DISSECTION PROPERLY DISPLAYED FOR ASSESSMENT.

2.

You have been provided with solutions S_3 and S_4, each of which contains one pure food substance. You have also been provided with an onion bulb. Prepare solution S_5 as described below.

(a)

(i) Remove the dry scale leaves from the onion.

(ii) Cut the onion into small pieces and mash it up with a pestle and mortar.

(iii) Add a little water, stir, and then decant to obtain a suspension. Label it S_5.

(b) Design and carry out tests to identify the carbohydrates present in S_3, S_4, and S_5.

Use iodine solution -----> Starch test

Use Benedict's solution -----> Reducing sugar test

(c)

(i) Which of the two solutions, S_3 and S_4, contains a food substance similar to that present in the onion bulb?

S_4 (assuming both S_4 and onion test positive for reducing sugar)

(ii) Suggest the name of the carbohydrate stored in onion bulbs.

Glucose (or Fructose)

3. (a) With the help of the key given below, identify specimens P_1 and P_2 by writing down the sequence of the numbers of the leads which direct you to the correct order of the specimen.

Follow the dichotomous key:

- P_1: 1a -----> Wings absent -----> Order: MALOPHAGA
- P_2: 1b -----> Wings present -----> 2a (2 wings) -----> Order: DIPTERA

(b) Identify the common name of specimens P_1 and P_2.

P_1 – Louse
P_2 – Housefly

(c) Compare features of P_1 and P_2 and classify them.
Both are in:
Phylum -----> Arthropoda
Class -----> Insecta
Differences: Wings, feeding structure, habitat

(d) Other insect orders from the key:
- ORTHOPTERA – Grasshopper
- COLEOPTERA – Beetle
- LEPIDOPTERA – Butterfly
- HYMENOPTERA – Bee, wasp

(b)
(i) Slice the onion provided in two, lengthways and take out one of the fleshy leaves. Using forceps, peel off the thin lining from the inner surface of the leaf. Cut out a small piece of the thin lining and place it on a slide. Add a drop of solution S_9.

(ii) Cut out another piece of the thin lining and place it on another slide. Add a drop of solution S_{10}.

(iii) Label each slide clearly, place a cover slip over the cells and examine the slides under the microscope, first under low power, then high power.

(iv) Make sketches of the appearance of the cells in each of the two solutions (S_9 and S_{10}).

(v) With the aid of the sketches in (iv) above, describe the appearance of the cells in each of the two solutions.

In S_9: Cells appear turgid with cell membrane close to the cell wall.
In S_{10}: Cells appear plasmolysed with cytoplasm shrunken away from the cell wall.

(vi) Account or give reasons for the observed difference in appearance of cells as sketched in (iv) above.

S_9 is hypotonic, causing water to move into the cell, making it turgid.
S_{10} is hypertonic, drawing water out, causing plasmolysis.

(vii) Draw up solution S_{10} from one side of the cover slip with a piece of filter paper and at the same time, add a drop or two of distilled water to the other side of the cover slip using a pipette. View the slide again under the microscope. Explain what happens to the cells.

Water enters the cells, and they become turgid again as the cytoplasm expands.
(viii) Suggest the aim of step (vii).
To demonstrate osmosis reversal — water entering plasmolysed cells making them regain turgidity.