THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

133/3A **BIOLOGY 3B**

(ACTUAL PRACTICAL B)

(For Both School and Private Candidates)

Time: 2:30 Hours **ANSWERS** **Year: 1996**

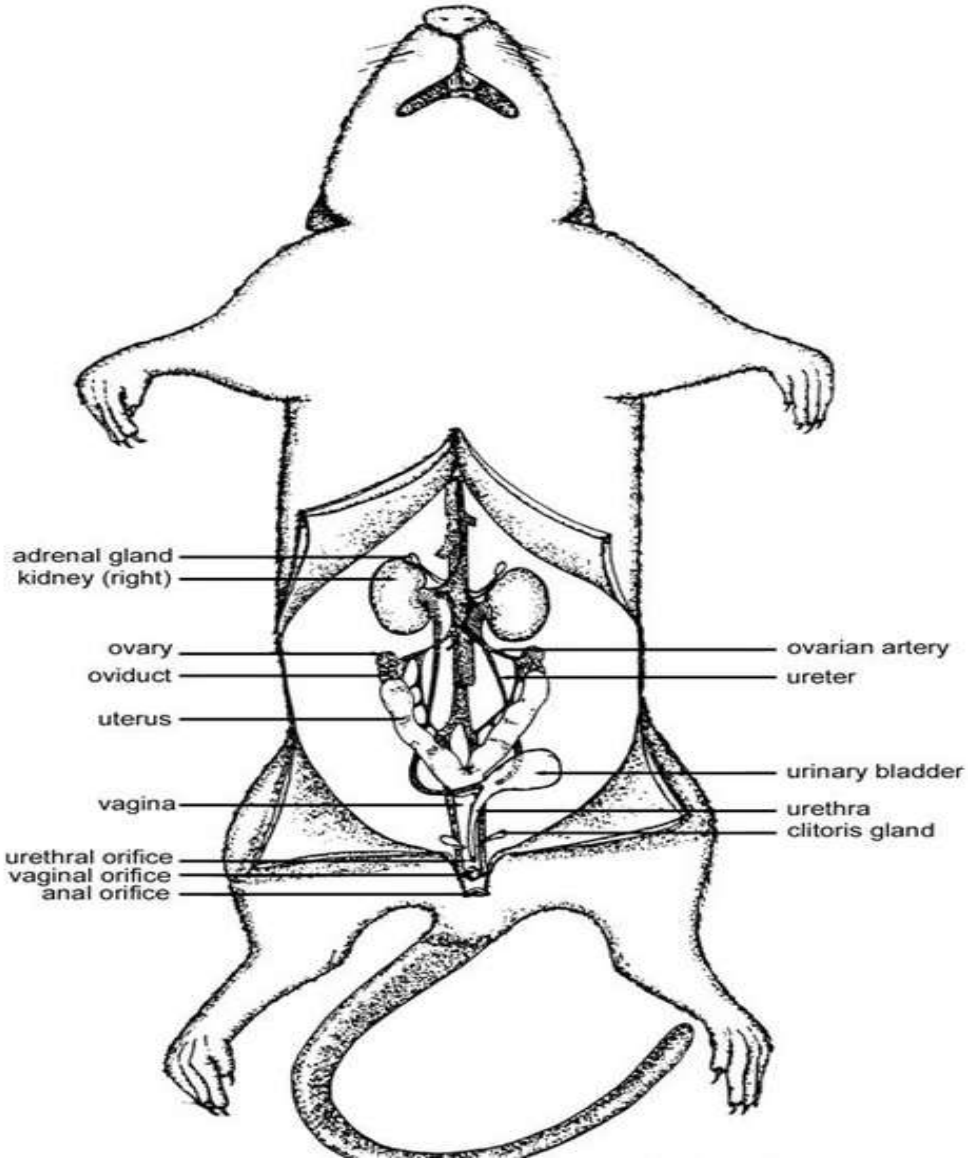
Instructions

1. This paper consists of three questions.

2. Answer all questions.

1. You have been provided with specimen S_1. Dissect it in the usual way to fully display the reproductive and excretory systems. Deflect the digestive system to your right-hand side to clearly show the systems asked for.

(a) Make a large, neat well labelled diagram of your dissection.



(b) Carefully examine the excretory system with a hand lens and state the structural adaptations which help to increase the total surface area for secretion and excretion.
- Highly convoluted tubules to increase surface area
- Presence of glomeruli in kidneys for filtration
- Numerous nephrons in kidney tissue
- Thin walls of renal tubules for diffusion

(c) Name the structures in the reproductive system of the animal that are responsible for gamete production.
- Testes (male)
- Ovaries (female)

(d) LEAVE YOUR DISSECTION PROPERLY DISPLAYED FOR ASSESSMENT.

2. Using the chemicals and reagents provided, carry out food tests to identify the different food substances which may be present in specimens A and B. Also provided: Benedict's, Biuret, iodine, and dilute HCl/NaOH.

Food substance tested	Procedure	Observation	Inference
Reducing sugar	Add Benedict's and boil	Brick-red precipitate	Reducing sugar present
Starch	Add iodine solution	Blue-black coloration	Starch present
Protein	Add NaOH and $CuSO_4$ (Biuret test)	Purple coloration	Protein present
Non-reducing sugar	Hydrolyze with HCl, neutralize, add Benedict's	Brick-red precipitate	Non-reducing sugar present

3. (a) Study specimen S_2 carefully.
(i) Give the common name for S_2.
Fern

(ii) To which phylum does S_2 belong?
Pteridophyta

(iii) Make a drawing of S_2 and label the sporophyte phase and gametophyte phase.
- Sporophyte: Fronds, rhizome
- Gametophyte: Prothallus

(iv) What two features make S_2 more adapted to terrestrial habitat than its close relatives in Class Hepaticae?
- Vascular tissues (xylem and phloem)
- Well-developed roots and leaves

(b) Study specimens S_3 and S_4.
(i) Name the classes to which each of them belongs.
S_3 -----> Monocotyledonae
S_4 -----> Dicotyledonae

(ii) What features helped you classify the two specimens into their respective classes?

- Leaf venation (parallel in monocots, netted in dicots)
- Number of cotyledons (1 vs 2)
- Number of floral parts (multiples of 3 vs 4/5)

(iii) What features do S_2 and S_4 have in common?
- True roots
- Vascular tissues

4. Specimens S_5, S_6 and S_7: Use a sharp scalpel to make a longitudinal cut of S_5.

(a) What type of placentation is displayed by S_5?
Axile placentation

(b) Write down the floral formula for S_5, S_6 and S_7.
Assuming typical structure:
- S_5: Br, actinomorphic, bisexual, K(5) C(5) A(5) G(2)
- S_6: Br, zygomorphic, bisexual, K(5) C(3+2) A(9)+1 G(1)
- S_7: Br, actinomorphic, unisexual, K(3) C(3) A(6) G(1)

(c) Using the key provided, classify specimens S_5, S_6 and S_7 and identify the correct families.

For S_5:
1b. Flower bisexual
2b. Flower regular
3a. Sepals fused with ovary capsule -----> POLYGALACEAE
For S_6:
1b. Flower bisexual
2b. Flower irregular
3b. Without stipules and many seeds -----> BALSAMINACEAE
For S_7:
1a. Flower unisexual
8b. More than one style -----> STERCULIACEAE