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: 2002**

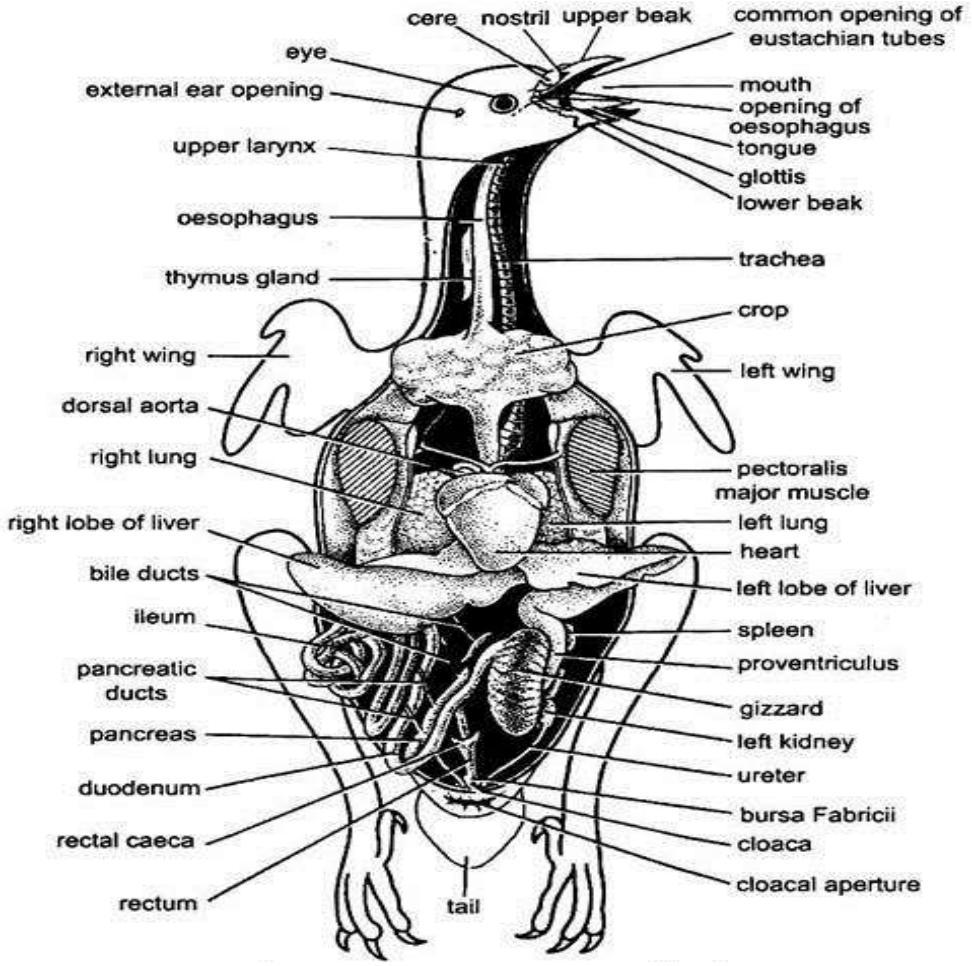
Instructions

1. This paper consists of three questions.

2. Answer all questions.

1.Dissect specimen S_1 provided in the usual way to display the spinal nerves. Note that it is important to remove the stomach, lungs, heart and the floor of the mouth as well as the kidneys. Take care not to cut the aorta.

(a) Make a large drawing of your dissection.
(b) Label on your drawing the following:
(i) Hypoglossal nerve
(ii) Brachial nerve
(iii) Sympathetic nerve
(iv) Sympathetic ganglion
(v) Ramus communicans
(vi) Spinal nerves no. 5, 6, 7, 8, 9 and 10
(vii) Sciatic plexus
(viii) Sciatic nerve



(c)(i) What are spinal nerves and what is their general function?
Spinal nerves are nerves that emerge from the spinal cord and carry motor, sensory, and autonomic signals between the spinal cord and the body. They connect the central nervous system to limbs and organs.

(ii) What does the following statement mean? "All spinal nerves are mixed nerves."
This means each spinal nerve carries both sensory (afferent) and motor (efferent) fibers, meaning they can send and receive signals.

(iii) LEAVE YOUR DISSECTION WELL DISPLAYED FOR ASSESSMENT.

2. (a) Label five test tubes 1–5 and in test-tube 5 collect saliva as follows:
(i) Rinse the mouth with water to remove food residues
(ii) Chew a rubber band to stimulate the flow of saliva
(iii) Collect about 30 cm^3 saliva

(b) Using a graduated pipette, place 5 cm^3 of 2% solution Y in test-tubes 1–4.
(c) Rinse the pipette and draw up 4 cm^3 saliva. Place 2 cm^3 in each of test-tubes 2 and 3 and shake the test-tubes to mix the contents. Leave the test-tubes for 5 minutes and copy the table below into your answer booklet.
(d) After 5 minutes, add 3 drops of iodine solution to test-tubes 1 and 2.
(e) Use the graduated pipette to add 3 cm^3 Benedict's solution to test-tubes 3 and 4 and place both test-tubes in the water bath for 5 minutes.
(f) Compare the final colours in the test-tubes and complete the table of results:

TEST-TUBE	CONTENT	TEST WITH	RESULTS	INTERPRETATION
1	2% solution Y	Iodine solution	Blue-black color	Starch present
2	2% solution Y + saliva	Iodine solution	No color change	Starch broken down
3	2% solution Y + saliva	Benedict's	Brick-red precipitate	Reducing sugar present
4	2% solution Y	Benedict's	No change	Reducing sugar absent

(g) Answer the following questions:
(i) Test-tube 2 contained a food substance present in solution Y at the beginning of the experiment; how do you explain the reaction with iodine solution at the end of the experiment?
Saliva contains amylase which digested starch into sugars, so iodine did not detect starch.

(ii) What food substance is Benedict's solution a test for?
Reducing sugars (e.g. glucose, maltose)

(iii) Was this food substance present in test-tube 3 or 4 at the BEGINNING of the experiment?
It was present in test-tube 3 at the end, not at the beginning.

(iv) What evidence have you to support your answer?
The brick-red precipitate formed after the reaction indicates reducing sugar was formed due to enzyme activity.

(v) What evidence is there to suggest that this food substance was present in test-tube 3 at the END of the experiment?
Positive Benedict's test result (brick-red precipitate)

(vi) What chemical change could have taken place in test-tubes 2 and 3 after adding saliva, which would explain the results in these tubes after applying the iodine test and Benedict's test?
Starch -----> Maltose/glucose by action of amylase in saliva

(vii) What part could saliva have played in this chemical change?
Saliva supplied amylase enzyme which broke down starch to reducing sugar

(h)(i) Name the natural food sources for the food substance contained in solution Y.
Maize, rice, cassava, potatoes (starch-rich foods)

(ii) Georgina has been diagnosed by Dr. Issa with hypertension (high blood pressure) due to obesity and fat deposits. Suggest giving reasons which among the above mentioned food sources in 2.g(i) Georgina should eat in order to reduce the high blood pressure to normal.
She should eat maize or potatoes (low in cholesterol, high in fiber), avoid refined starch and high-fat foods. Whole foods promote satiety and better heart health.

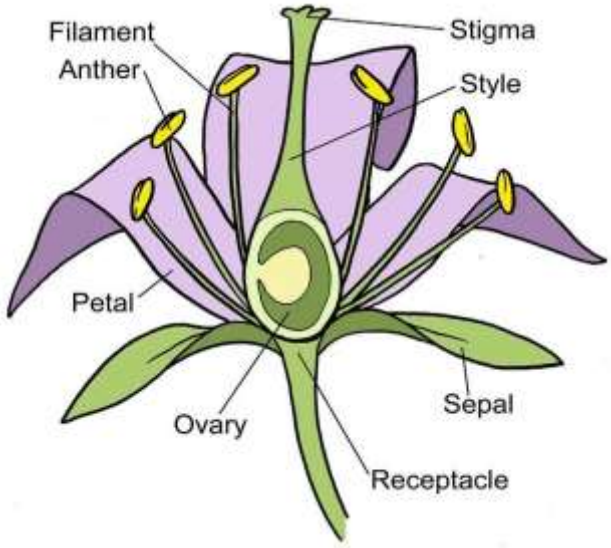
3.(a) Study specimen K provided:
(i) State the common name of specimen K
bird

(ii) State the kingdom to which specimen K belongs
Kingdom -----> Animalia

(iii) State animal-like characteristics exhibited by members of the kingdom to which specimen K belongs

- Heterotrophic
- Motile at some stage
- No cell walls

(b) (i) Study specimen L carefully
(ii) Draw the floral diagram and write down the floral formula of specimen L
Example formula (for a hibiscus-like flower):



Br actinomorphic
K(5) C(5) A(∞) G(1) superior

(c) Study specimen M:
(i) Give the phylum and class of specimen M
Example:
Phylum -----> Arthropoda
Class -----> Insecta

(ii) Draw a well labelled diagram of specimen M
Labels: Head, thorax, abdomen, antennae, compound eyes, legs, wings

(iii) Name the structures in specimen M which are involved in locomotion.
- Jointed legs
- Wings (if present)