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: 2002**

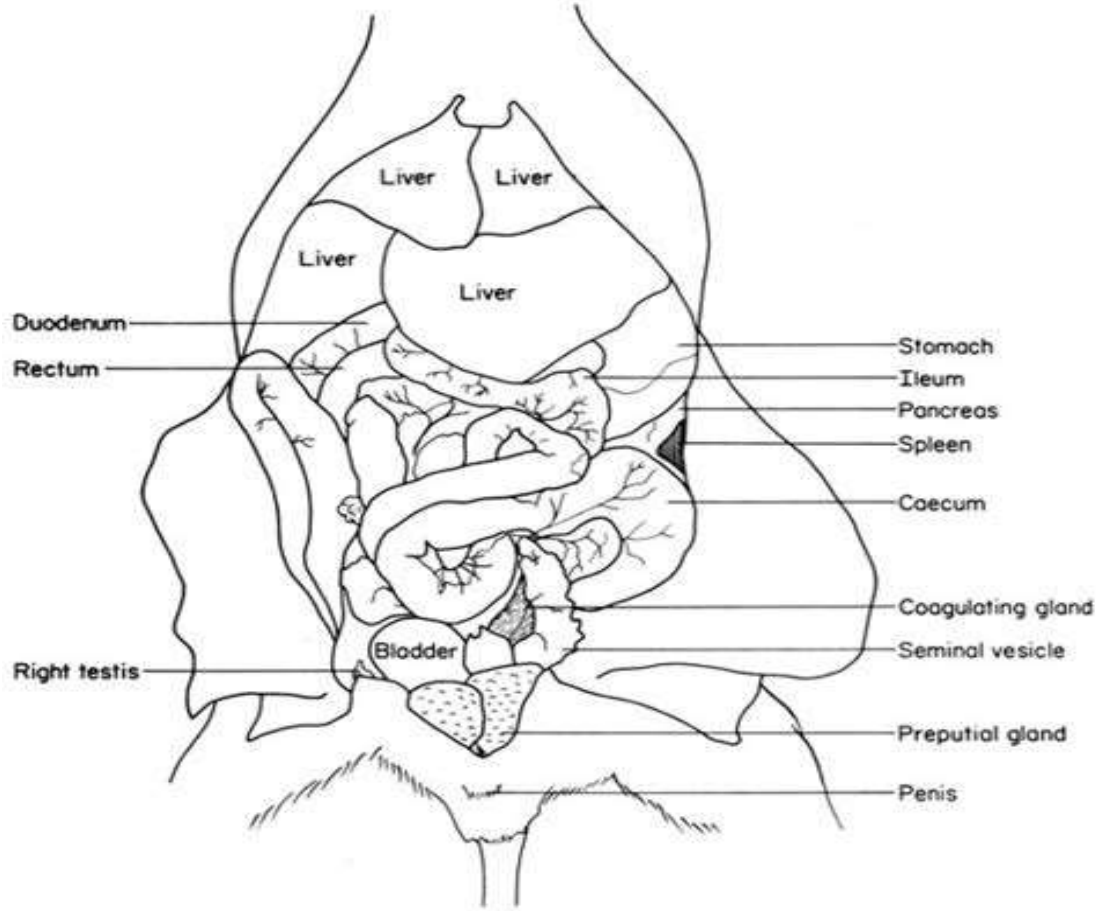
Instructions

1. This paper consists of three questions.

2. Answer all questions.

1. You have been provided with specimen B_1. Dissect the specimen to display the digestive system on the right-hand side of the animal.

Draw a large diagram of the dissection and label the following structures:
(a) Oesophagus
(b) Crop
(c) Gizzard
(d) Digestive/mesenteric caeca
(e) Midgut
(f) Ileum
(g) Colon
(h) Rectum
(i) Digestive–excretory structure



2. (a) Specimen B_2 is a mixture of different food substances. Design and carry out experiments to identify these foods using the reagents provided. Record your working as shown in the table below:

Food substance tested	Procedure	Observation	Inference
Reducing sugar	Add Benedict's solution, heat	Brick-red precipitate forms	Reducing sugar present
Protein	Add Biuret reagent	Violet or purple color appears	Protein present
Starch	Add iodine solution	Blue-black color appears	Starch present
Lipid	Add ethanol, shake, then add water	Milky white emulsion forms	Lipid present

(b) What role is played by each food substance you have identified in B_2 in children?

- Reducing sugar -----> Provides instant energy for physical and mental activity
- Protein -----> Essential for growth and tissue repair
- Starch -----> Serves as stored energy that can be broken down over time
- Lipid -----> Provides insulation and long-term energy storage

(c) Excess of one of the food substances identified in B_2 is usually stored in the body.

(i) Name the hormone which influences the conversion of the food substance in a form that can be stored in the body.
Hormone: Insulin

(ii) Write a word equation for the process in 2(c)(i) above.
Glucose + Glucose + Glucose + … -----> Glycogen

(iii) In which body organ does the process 2(c)(i) above occur?
Organ: Liver

3.
(a) Identify the common names and class names of specimens B_3, B_4, B_5 and B_6.

Example identifications:
- B_3 – Housefly (Class Insecta)
- B_4 – Butterfly (Class Insecta)
- B_5 – Grasshopper (Class Insecta)
- B_6 – Beetle (Class Insecta)

(b) State the observable differences between the external and internal features of specimens B_4 and B_6.

External:
- B_4 (Butterfly) has soft, scaly wings, slender body
- B_6 (Beetle) has hardened forewings (elytra), robust body

Internal:
- B_4 may have siphoning mouthparts
- B_6 may have chewing mouthparts and tough digestive tract

(c) Name the classification ranks common to specimens B_3, B_4, B_5 and B_6.
Kingdom -----> Animalia
Phylum -----> Arthropoda
Class -----> Insecta

(d) Use the key provided to place each of the specimens B_3, B_4, B_5 and B_6 in its correct order.

Using the key:

- B_3: 1b -----> 2b -----> 3a -----> Order: Diptera
- B_4: 1b -----> 2b -----> 3b -----> 4b -----> 5b -----> Order: Lepidoptera
- B_5: 1b -----> 2b -----> 3b -----> 4b -----> 5a -----> Order: Orthoptera
- B_6: 1b -----> 2b -----> 3b -----> 4a -----> Order: Coleoptera