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: 2017**

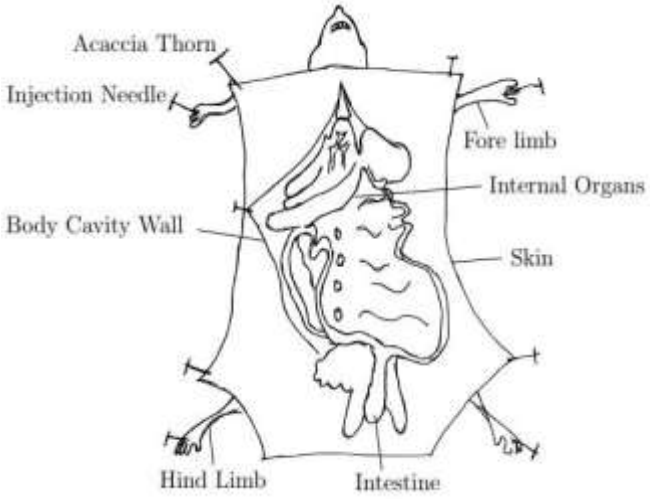
Instructions

1. This paper consists of three questions.

2. Answer all questions.

1. You have been provided with specimen S_1. Dissect the specimen S_1 in a usual way to fully display the digestive system. Pin the ileum to the right side of the animal.

(a) Draw a large, neat, well labelled diagram of your dissection.
Leave your dissection properly displayed for assessment.



(b) (i) How does the ileum in the specimen S_1 modified to suit its function?

- It is long and coiled to increase the surface area for absorption.
- It has numerous villi and microvilli to enhance nutrient absorption.
- It is richly supplied with blood capillaries to transport absorbed nutrients.
- The inner lining contains enzymes for final digestion of food.

(ii) How does specimen S_1 adapt to its mode of life?

- Possesses strong limbs for locomotion or burrowing depending on its habitat.
- Has protective coloration for camouflage against predators.
- Has well-developed sense organs (e.g. eyes, nose) to detect food or danger.
- Efficient digestive and respiratory systems for energy and survival.
- Behavioral adaptations like nocturnality or hiding enhance survival.

2. You are provided with solutions S_2 and S_3.

(a) Using the reagents provided, carry out a biochemical test to identify the food substances present in solutions S_2 and S_3. Tabulate your work as shown in the following table:

Food Tested	Procedure	Observation	Inference
S_2	Add Benedict's solution and heat	Brick-red precipitate forms	Reducing sugar present

| S_3 | Add dilute HCl, heat, then neutralize with NaOH, add Benedict's solution and heat | Brick-red precipitate forms | Non-reducing sugar present (after hydrolysis) |

(b) Why do we use sodium hydroxide and dilute hydrochloric acid in the biochemical experiment?

- Dilute hydrochloric acid hydrolyzes non-reducing sugars (e.g. sucrose) into reducing sugars.
- Sodium hydroxide is used to neutralize the solution after hydrolysis to allow Benedict's test to work properly (Benedict's solution requires neutral or slightly alkaline conditions).

3. You have been provided with specimens G_3, G_4, G_5, and G_6.

(a)
(i) Identify the specimens G_3, G_4, G_5 and G_6 by their common names.

G_3 – Grasshopper
G_4 – Butterfly
G_5 – Housefly
G_6 – Mosquito

(ii) Classify G_4, G_5 and G_6 to class level.

Kingdom: Animalia
Phylum: Arthropoda
Class: Insecta

(b) What are the observable differences between the specimens G_4 and G_6 at Class level?

- G_4 (Butterfly) has broad wings with scales, while G_6 (Mosquito) has narrow wings.
- G_4 has a long proboscis for sucking nectar, while G_6 has a piercing-sucking mouthpart.
- G_4 is diurnal (active during the day), G_6 is often nocturnal.

(c) In what ways are the specimens G_4 and G_6 important in the ecosystem?

G_4 (Butterfly) – Important for pollination of flowering plants.
G_6 (Mosquito) – Plays a role in food chains and pollination (females may also transmit diseases, but larvae help in decomposition in aquatic habitats).

(d) Where can we find the specimen G_6?

In stagnant water areas such as ponds, ditches, containers, and marshes, especially during the breeding season.