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: 2013**

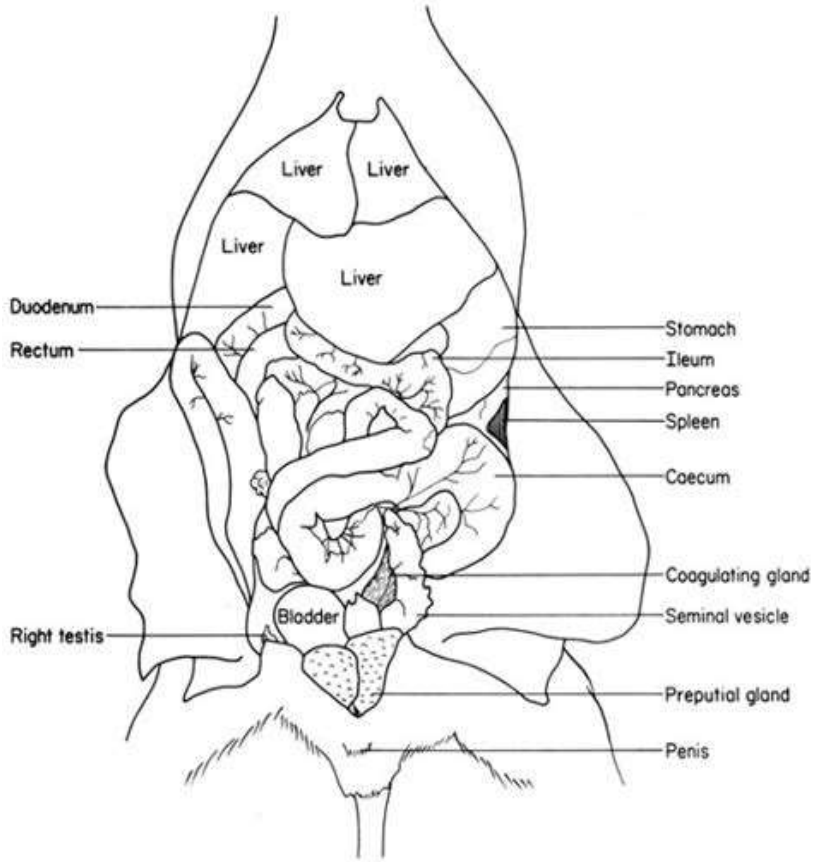
Instructions

1. This paper consists of three questions.

2. Answer all questions.

1. Dissect specimen S_1 in the usual way to fully display the viscera general. Pin out the alimentary canal to your right hand side.

(a) Make a neat well labelled diagram of your dissection.
The diagram should include: mouth, oesophagus, stomach, small intestine (duodenum, ileum), large intestine, rectum, anus, liver, pancreas, kidneys, reproductive organs (testes or ovaries), and bladder or cloaca.



(b) Identify the sex of specimen S_1. Give two reasons to support your answer.
Sex: Male
Reasons:
- Presence of testes
- Presence of vas deferens and absence of ovaries or uterus

(c) How is specimen S_1 adapted to its mode of life?
- Streamlined body for movement in its habitat
- Sharp claws or limbs for burrowing, climbing, or walking
- Keen sense organs for locating food and detecting danger
- Camouflage or body coloration for blending with the environment
- Well-developed digestive system suited for its feeding habits

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 Table 1:

Food tested	Procedure	Observation	Inference
S_2	Add dilute HCl, heat, neutralize with NaOH, add Benedict's solution, boil	Brick-red precipitate forms	Non-reducing sugar present
S_3	Add Biuret solution	Purple color appears	Protein present

(b) State the role played by Sodium hydroxide and Dilute hydrochloric acid in the biochemical experiment.
- Dilute hydrochloric acid hydrolyzes non-reducing sugars into reducing sugars.
- Sodium hydroxide neutralizes the acid to create a suitable pH for Benedict's test.

3. You have been provided with specimens G_3, G_4, G_5, G_6 and G_7.

(a) Identify specimens G_3, G_4, G_5 and G_7 by their common names.
G_3 – Housefly
G_4 – Grasshopper
G_5 – Butterfly
G_7 – Beetle

(b) State the observable differences between specimens G_4 and G_7 at class level.
G_4 (Grasshopper):
- Has long hind legs for jumping
- Wings not hardened
- Mouthparts adapted for chewing

G_7 (Beetle):
- Hardened forewings (elytra)
- Legs all same size
- Compact body

(c) State two economic importance of specimen G_4 and G_7.
G_4 (Grasshopper):
- Acts as a pest on crops
- Serves as food for other animals

G_7 (Beetle):
- Helps in decomposing organic matter

- Some beetles are crop pests

(d) Classify specimen G_7 to class level and state its habitat.
Kingdom: Animalia
Phylum: Arthropoda
Class: Insecta
Habitat: Soil, under logs, in crops, or leaf litter

(e) By listing the number of the statements from the dichotomous key below identify the order of each specimen G_3, G_4, G_5 and G_6.

G_3:
1(b) → 2(b) → 3(a) → Order: Diptera (Housefly)

G_4:
1(b) → 2(b) → 3(b) → 4(b) → 5(a) → Order: Orthoptera (Grasshopper)

G_5:
1(b) → 2(b) → 3(b) → 4(b) → 5(b) → Order: Lepidoptera (Butterfly)

G_6:
1(b) → 2(b) → 3(b) → 4(a) → Order: Coleoptera (Beetle)