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: 1998**

Instructions

1. This paper consists of three questions.

2. Answer all questions.

1.Open up the abdominal cavity of specimen S_1 in the usual way. Carefully move the bulk of the visceral contents to your left and rearrange the parts with minimum disturbance to fully display them.

(a) (i) Draw a large and neat diagram of the dissection.
Include the following:
- Liver
- Stomach
- Pancreas
- Small intestine (duodenum, jejunum, ileum)
- Large intestine (colon, caecum, rectum)
- Gall bladder
- Mesentery
- Hepatic portal vein

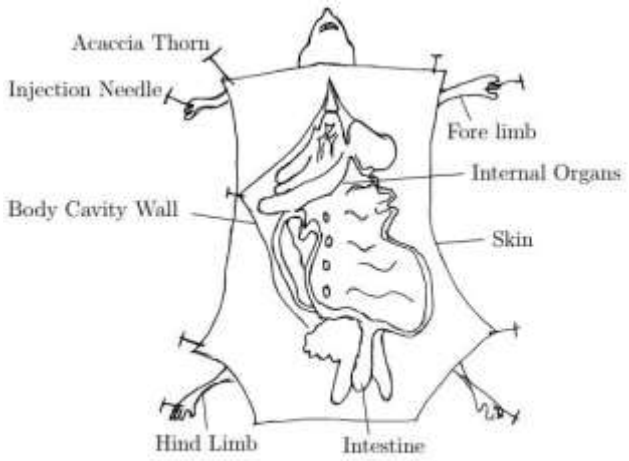

Figure 5.7: A labeled diagram of a rat dissection

- Villi (if close-up)

(ii) Using letters A – I, label on the diagram the organs/structures concerned with the functions below:

Label | Function | Biological name
A -----> Temporary storage of food -----> Stomach
B -----> Exocrine and endocrine secretion -----> Pancreas
C -----> Final digestion and absorption of soluble nutrients -----> Ileum
D -----> Transport of products of digestion to the liver -----> Hepatic portal vein
E -----> Active absorption of water -----> Colon
F -----> Production of bile -----> Liver
G -----> Reception of chyme -----> Duodenum
H -----> Temporary storage of undigested food remnants -----> Rectum
I -----> Microbial breakdown of cellulose -----> Caecum

(iii) Give the biological names of structures A – I.
(Provided above)

(b)(i) What two products of digestion are transported by structure D?
- Glucose
- Amino acids

(ii) Mention two other roles of each of structures A and F.

Structure A (Stomach):
- Initiates protein digestion with pepsin
- Mixes food with gastric juices to form chyme

Structure F (Liver):
- Detoxifies harmful substances
- Stores glycogen and vitamins

(c) LEAVE YOUR DISSECTION PROPERLY DISPLAYED FOR ASSESSMENT

2. (a) Mr. Weakhead wrongly labelled the food solutions. Design experiments to correctly identify each solution using:
- Benedict's solution
- Dilute HCl
- NaOH
- Saliva (collected properly)

Food Substance	Procedure	Observation	Inference
A	Add Benedict's directly and boil	No change	Not glucose
	Hydrolyse with HCl, neutralize with NaOH, then add Benedict's and boil	Brick-red precipitate	Sucrose (non-reducing sugar)
B	Add Benedict's and boil	Brick-red precipitate	Glucose
C	Add NaOH + $CuSO_4$ (Biuret test)	Purple colour	Protein
D	Add iodine solution	Blue-black colour	Starch

(b)
(i) Why was it necessary to rinse the mouth before collecting saliva?
To remove any food particles or sugars that might alter test results.

(ii) Why was saliva used in your experiment?
Saliva contains salivary amylase which breaks down starch into maltose.

(c)(i) Name the hormone involved:
Insulin

(ii) In what form is the food substance stored?
As glycogen

(iii) Where in the body is it stored?
In the liver and muscles

3. (a) (i) Identify each specimen by genus name:
S_2 -----> Zea
S_3 -----> Allium

(ii) Name Kingdoms and Phyla:
Zea:
Kingdom -----> Plantae
Phylum -----> Angiospermophyta

Allium:
Kingdom -----> Plantae
Phylum -----> Angiospermophyta

(iii) Two observable features that distinguish S_2 and S_3:
- Leaf venation: S_2 has parallel veins, S_3 has netted veins
- Root structure: S_2 has fibrous roots, S_3 has tap root

(b)(i) Provide floral diagram and formula for specimen S_4:
Floral formula:
Br, actinomorphic, bisexual
K(3) C(3) A(6) G(1) superior

(ii) Give the family name:
Liliaceae

(iii) Where exactly is the female gametophyte in S_4?
Inside the ovule within the ovary

4.
(a) Specimens S_5 and S_6 belong to the same Kingdom as you. Observe their features carefully.

(i) What is the lowest level of the classification hierarchy shared by you and the 2 animal specimens?
Class level

(ii) Name the classes to which specimens S_5 and S_6 belong.

S_5 -----> Mammalia
S_6 -----> Aves

(iii) In what kind of habitats would you expect to find specimens S_5 and S_6?
S_5 -----> Terrestrial habitats (e.g., forests, grasslands)
S_6 -----> Aerial or arboreal habitats (e.g., trees, open sky, woodlands)

(iv) Identify any two observable features which adapt each specimen to its habitat.
S_5 (Mammal):
- Fur/hair for insulation
- Well-developed limbs for movement on land

S_6 (Bird):
- Feathers for flight
- Beak adapted to feeding style

(b) Examine the external features of specimens S_7 and S_8.

(i) Give the common name for each specimen.
S_7 -----> Stamen
S_8 -----> Pistil (Carpel)

(ii) What is the importance of specimen S_7 to angiosperms?
S_7 (Stamen) produces pollen grains which are male gametes necessary for fertilization

(iii) Draw and label specimen S_8 to show its external features.