THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

733/2B **BIOLOGY 2B**

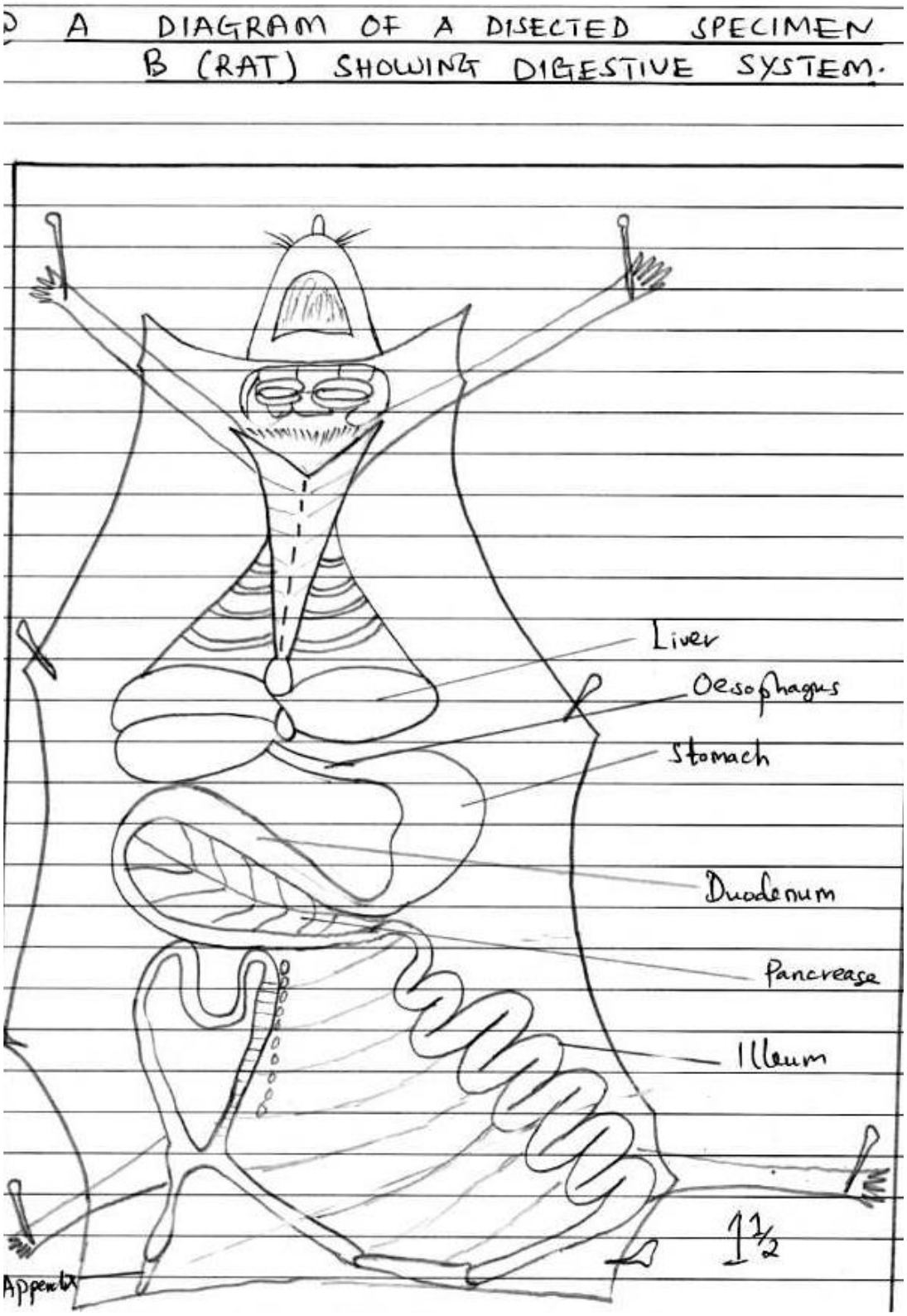
Time: 3 Hour. **ANSWERS** **Year: 2006**

Instructions

1. This paper has three papers.
2. Answer **all** questions.
3. Question **1** contains 30 marks while question 2 and 3 have 10 marks each.
4. Mobile phones are not allowed inside the examination room.
5. Write your Examination Number on every page of your answer booklet.

1. Dissect specimen K (Rat or Guinea pig) to expose the digestive system.

(a) (i) Draw a labelled diagram showing six digestive system parts.



(ii) Mark the positions of the liver, small intestine, and caecum.

In the diagram, include the mouth, esophagus, stomach, small intestine, caecum, and rectum. Clearly label the liver above the stomach, and show the small intestine as a coiled tube after the stomach. The caecum should appear as a pouch between the small and large intestines.

(b) (i) Identify the structure responsible for enzyme secretion.

The pancreas is the main structure responsible for secreting digestive enzymes like trypsin, amylase, and lipase into the small intestine.

(ii) Name the part where bile is stored.

Bile is stored in the gall bladder before being released into the small intestine to aid fat digestion.

(iii) Which organ connects the mouth to the stomach?

The esophagus connects the mouth to the stomach. It transports swallowed food via peristalsis.

(c) (i) Is the gall bladder visible?

(ii) What is the function of bile?

In rats, the gall bladder is absent. However, in guinea pigs, it may be present. Bile emulsifies fats, breaking them into smaller droplets to increase surface area for enzyme action.

2. You are given specimen N for enzymatic testing using hydrogen peroxide.

(a) (i) State the purpose of this experiment.

The purpose is to test for the presence of catalase enzyme in specimen N, which breaks down hydrogen peroxide into water and oxygen gas.

(ii) Identify the control tube.

The control is the unground part in test tube B. It verifies that grinding increases the exposure of catalase and hence the reaction.

(iii) What difference was observed? Why?

In test tube A (ground specimen), there was effervescence due to rapid oxygen release. In test tube B, there was little or no bubbling. Grinding broke open more cells, releasing more catalase.

(b) (i) Name the gas released.

Oxygen gas was released, confirmed by relighting a glowing splint.

(ii) Write a balanced chemical equation for the reaction.

$2H_2O_2 \rightarrow 2H_2O + O_2$

(iii) What conclusion can be drawn from this experiment?

Specimen N contains the catalase enzyme, which decomposes hydrogen peroxide. Grinding increases enzyme exposure and accelerates the reaction.

3. Observe specimens O (Mushroom), P (Bee), and Q (Spider).

(a) (i) Why is P placed in class Insecta? Give three reasons.

P has three body parts (head, thorax, abdomen), one pair of antennae, and three pairs of jointed legs. It also has compound eyes and two pairs of wings.

(ii) What economic benefit is derived from specimen P?

The bee helps in pollination, increasing crop yields. It also produces honey, which is harvested commercially.

(b) (i) Give three differences between P and Q.

P (bee) has antennae, six legs, and three body segments. Q (spider) has no antennae, eight legs, and two body segments (cephalothorax and abdomen).

(ii) Draw specimen O and label three parts.

(iii) Name the kingdom of specimen O.

The drawing should include the cap, stalk, and gills. Specimen O belongs to the Kingdom Fungi.