THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

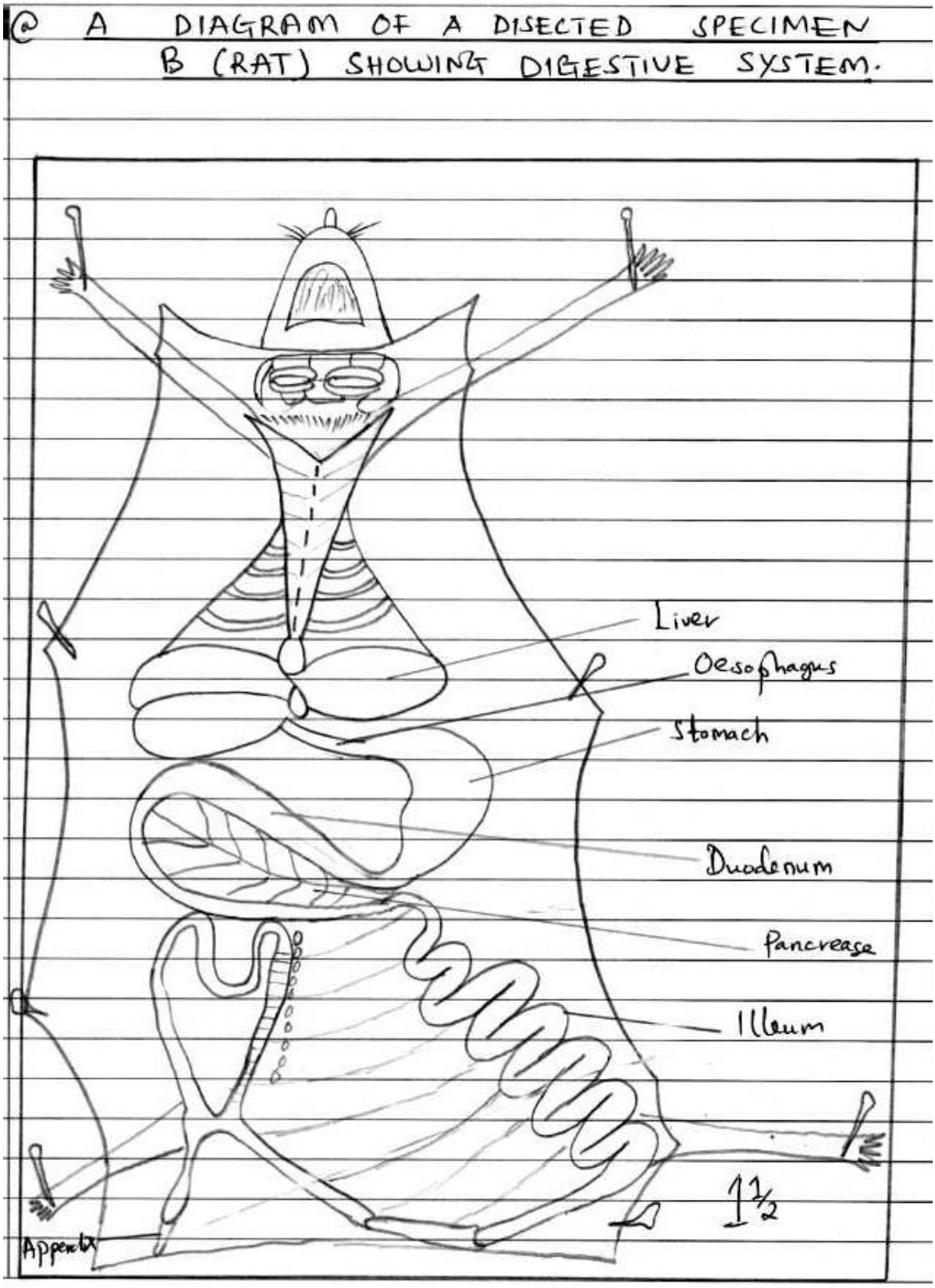
733/2 **BIOLOGY 2B**

Time: 3 Hour. **ANSWERS** **Year: 2010**

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 V (guinea pig or rat) to expose the digestive system.**
   (a) Draw and label six parts of the digestive system.



(b) Identify the organ for:

(i) Carrying food from mouth to stomach

The esophagus is responsible for transporting food from the mouth to the stomach through peristaltic movements.

(ii) Enzyme ptyalin production

Ptyalin, or salivary amylase, is produced in the salivary glands located in the mouth region. These glands secrete saliva that initiates carbohydrate digestion.

(iii) Bile secretion

Bile is secreted by the liver. It helps emulsify fats into smaller droplets, making them easier to digest in the small intestine.

(c) Does the specimen have a gall bladder? Explain.

Yes, the guinea pig or rat has a gall bladder. This small sac stores bile produced by the liver before it is released into the duodenum. The presence of the gall bladder can be observed as a small greenish sac beneath the liver lobe.

2. You are provided with specimen W. Follow these procedures:

(a) Cut W in half and grind one part (test tube A), keep the other intact (test tube B).
(b) Add 2 ml hydrogen peroxide to both. Observe reactions and test the gas using a glowing splint.

(i) What is the aim of the experiment?
The aim is to determine the presence and activity of the enzyme catalase in specimen W by observing the breakdown of hydrogen peroxide into water and oxygen.

(ii) Which test tube is the control?
Test tube B is the control because it contains the unground portion of the specimen, meaning there is minimal exposure of catalase enzymes compared to the crushed sample in test tube A.

(iii) Explain observations in both tubes.
In test tube A, vigorous bubbling occurs due to rapid breakdown of hydrogen peroxide by catalase, releasing oxygen gas. In test tube B, there is minimal or no bubbling because the intact cells limit the contact between the enzyme and hydrogen peroxide.

(iv) Name the enzyme responsible and write the chemical equation.
The enzyme is catalase.
The reaction is:
$2H_2O_2 \rightarrow 2H_2O + O_2$
(v) Identify the gas evolved and draw two conclusions.
The gas evolved is oxygen, confirmed by relighting a glowing splint.
This indicates that specimen W contains the enzyme catalase.
It also proves that catalase actively breaks down hydrogen peroxide into oxygen and water.

3. Observe specimens E (Butterfly), F (Beetle), G (Grasshopper), H (Animal skin), and I (Fern).

(a) List five shared features between specimens E and F.
Both have segmented bodies divided into head, thorax, and abdomen.
Each has three pairs of legs attached to the thorax.
They both possess compound eyes for detecting movement and light.
Wings are present in both, though with different structures.
They have antennae used for sensing the environment.

(b) Give four industrial uses of specimen H.
Animal skin is used to make leather for shoes, bags, and belts.
It is processed into upholstery for furniture and car seats.
Skin is used in textile industries for fashion items like jackets.
It is also used in the manufacture of drums and other musical instruments.

(c) (i) What structures are visible on lower side of I?
Sori (singular: sorus) are visible on the underside of fern leaves.

(ii) State their function.
Sori contain sporangia, which produce spores for asexual reproduction in ferns.

(d) List three features used to classify specimens E, F, and G into one phylum.
They all have exoskeletons made of chitin.
Their bodies are segmented with jointed appendages.
They exhibit bilateral symmetry and undergo metamorphosis during development.