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: 2021**

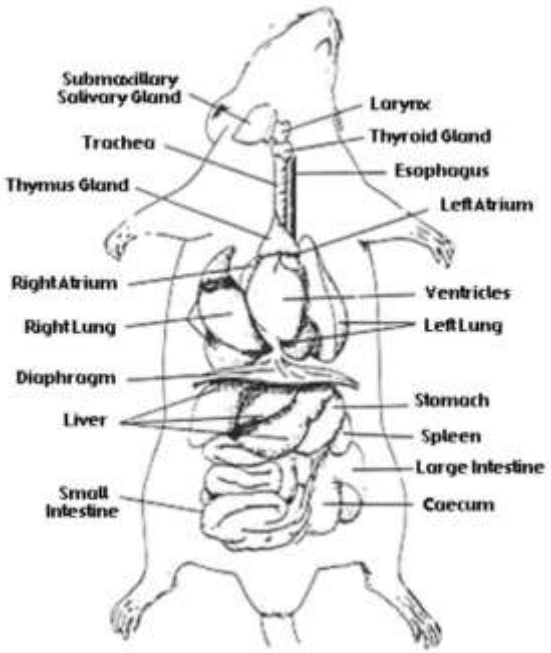
Instructions

1. This paper consists of three questions.

2. Answer all questions.

1. You have been provided with specimen K. Dissect the specimen to fully display viscera general.

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



(b)(i) Identify two structures in specimen K which form the small intestine.

Duodenum
Ileum

(ii) How do the structures you identified in 1(b)(i) adapted to their function? Give three points for each.

Duodenum:
- Receives bile and pancreatic juices which aid digestion.
- Has Brunner's glands that secrete mucus to protect the lining.
- Has villi to increase surface area for absorption of digested nutrients.

Ileum:
- Contains numerous villi and microvilli for maximum absorption.
- Has a rich blood supply for efficient transport of absorbed nutrients.
- Contains lymphoid tissue (Peyer's patches) for immune defense.

2. You have been provided with two test tubes, a larger beaker, thermometer, starch suspension, pure drinking water and the table reagents. Carry out experiments using procedures (i)–(vii) then answer the questions that follow:

Procedures
(i) Take 2 test tubes and label them as test tube 1 and test tube 2 respectively.
(ii) Rinse your mouth with pure drinking water, and then collect your saliva by spitting 2 ml into test tube 1.
(iii) Put the 2 ml of water into test tube 2.
(iv) Add 2 ml of starch suspension to each test tube. Shake the test tubes.
(v) Put the tubes in a beaker of water at 40°C. Leave them for 10 minutes.
(vi) Put 2 drops from each test tube into separate dimples of the white tile, then add a drop of iodine solution. Note the results.
(vii) Add 3 ml of Benedict's solution to each test tube, and then boil the test tubes for a minute. Note the results.

Questions

(a) Based on the observations in procedure (v) and (vi), write what happened to the iodine and Benedict's test respectively. Record your experimental results as shown in Table 1.

Table 1

Test Tube	Result of Iodine test	Result of Benedict's test
1	No blue-black color; starch absent	Brick-red precipitate; reducing sugar present
2	Blue-black color; starch present	No color change; no reducing sugar

(b) Why water in test tube 2 was needed in place of saliva?

Water served as a control to show the effect of saliva (which contains amylase). It does not break down starch.

(c) Which test tube contained starch at the end of experiment? Give a reason to support your answer.

Test tube 2 contained starch because water cannot break starch, so iodine turned blue-black indicating starch presence.

(d) What is the effect of saliva on starch?

Saliva contains amylase which breaks down starch into maltose, a reducing sugar.

(e) Why warmth in procedure (iv) and (vi) of the experiment is important to our bodies?

Warmth (around 40°C) provides optimal temperature for amylase enzyme activity. Without warmth, enzyme action would be slow or inactive.

(f) What is the importance of the food substance contained in test tube 1 at the end of experiment?

The reducing sugar (maltose) produced is an energy source for body metabolism.

(g) In what ways is the knowledge used in the experiment useful in your daily life?

It helps us understand how digestion works in the mouth, the importance of enzymes, and why temperature affects digestion rate.

3. You have been provided with specimens L, T, W, X, Y and Z.

(a) Give three distinctive features used to place each of the specimens L and Y in its respective Kingdom.

L:
- Presence of cell wall
- Photosynthetic pigments (chlorophyll)
- Autotrophic nutrition

Y:
- Heterotrophic nutrition
- Lacks cell wall
- Multicellular and motile

(b) State one advantage and disadvantage of each of the specimens L and Y.

L:
Advantage – Produces own food via photosynthesis
Disadvantage – Depends on sunlight and cannot move

Y:
Advantage – Can move and search for food
Disadvantage – Depends on other organisms for energy

(c) Construct a bracketed key for identification of the specimens T, W, X, Y and Z using the following features:
(i) Nature of the skeleton
(ii) Wings
(iii) Scales
(iv) Body partition

1a Has exoskeleton – Go to 2
1b Has endoskeleton – Go to 3

2a Has wings – T
2b No wings – W

3a Body covered with scales – X
3b Body not covered with scales – Go to 4

4a Body has three distinct regions (head, thorax, abdomen) – Y
4b Body not clearly divided – Z