THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
DIPLOMA IN SECONDARY EDUCATTION EXAMINATION

733/2A **BIOLOGY 2A**

(ACTUAL PRACTICAL A)

Time: 3 Hours **ANSWERS** **Thursday, 13th May 2011 a.m**

Instructions.

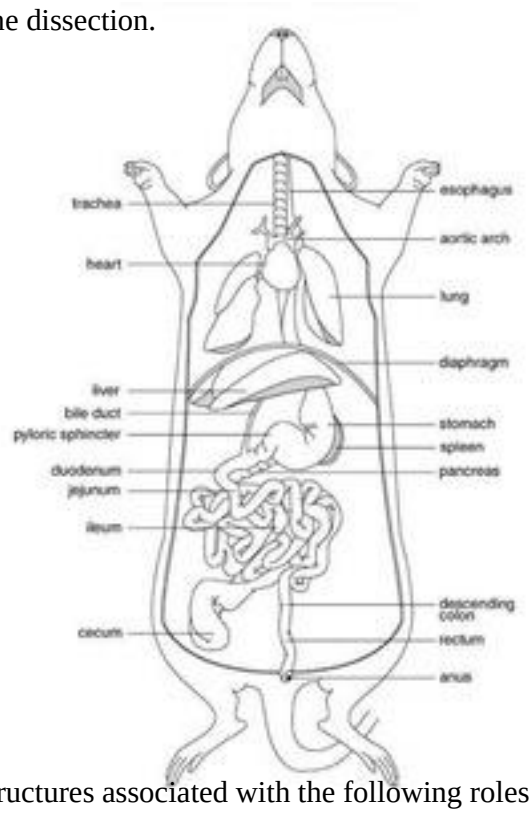
1. This paper consists of **three (3)** questions.
2. Answer **all** questions
3. Question number 1 carries 40 marks and the rest carry 30 marks.
4. Cellular phones are **note** allowed in the examination room.
5. Write your **examination Number** on every page of your answer booklet(s).

1. You have been provided with specimen M. Dissect the specimen in the usual way to display the alimentary canal to the left of the specimen.

(a) Draw a large neat labelled diagram of the dissection.

Answer:
Your dissection diagram should show:

- Mouth
- Oesophagus
- Crop
- Gizzard
- Stomach
- Small intestine
- Large intestine
- Rectum
- Anus



(b) Briefly describe the adaptation of the structures associated with the following roles in specimen M:

(i) Absorption of digested food.

Answer:
The small intestine is long, coiled, and thin-walled to increase surface area for maximum absorption. Its lining contains numerous villi and microvilli (if applicable in higher animals) to further increase surface area and ensure efficient absorption of nutrients into the bloodstream.

(ii) Absorption of water.

Answer:
The rectum or large intestine is thick-walled with specialized cells for water reabsorption from undigested food, helping to form solid feces and conserve body water, especially in dry environments.

(c) Classify M to the class level.

Answer:
Kingdom: Animalia
Phylum: Arthropoda
Class: Insecta

2. Solution Z is a mixture of different food substances.

(a) Using the chemicals and reagents provided, carry out food test to identify the food substances present in solution Z.

FOOD TESTED	PROCEDURE	OBSERVATION	INFERENCE
Starch	Add iodine solution	Blue-black colour appears	Starch present
Reducing sugar	Add Benedict's solution and heat in a water bath	Colour changes to green/yellow/orange/red	Reducing sugar present
Protein	Add Biuret solution	Purple/violet colour appears	Protein present
Lipids	Add ethanol, shake, then add water (Emulsion test)	White emulsion forms	Lipids present

(b) For each food substance identified in 2(a) above;

(i) Name the end product after digestion.

- Starch — Glucose
- Reducing sugar — Glucose (already simple, no further digestion needed)
- Protein — Amino acids
- Lipids — Fatty acids and glycerol

(ii) Name the enzymes responsible for its digestion.

- Starch — Amylase (salivary and pancreatic)
- Reducing sugar — No enzyme required (already simple)
- Protein — Pepsin, Trypsin, Erepsin
- Lipids — Lipase

(c) Describe two roles played by each identified food substance in human body.

Starch (Glucose):

1. Provides energy for body functions.
2. Stored as glycogen in the liver and muscles.

Reducing sugar:

1. Instant source of quick energy.
2. Maintains blood glucose levels.

Protein (Amino acids):

1. Builds and repairs body tissues.
2. Forms enzymes, hormones, and antibodies.

Lipids:

1. Source of long-term energy.
2. Insulates the body and protects vital organs.

(d) Excess of one of the identified food substances in the body is changed into urea which is then excreted by the kidneys. Name and explain the process involved in the changes.

Answer:
The food substance is **protein (amino acids)**.
Process: **Deamination**
Explanation: In the liver, excess amino acids are broken down. The amino group (NH_2) is removed and converted into ammonia, which is toxic. Ammonia is then converted into urea, a less toxic compound, and transported by blood to the kidneys for excretion in urine.

3. You have been provided with specimens S_1, S_2, S_3, S_4, S_5, and S_6.

(a)

(i) Identify each specimen by its common name.

S_1 — Housefly
S_2 — Earthworm
S_3 — Grasshopper
S_4 — Fern
S_5 — Millipede
S_6 — Butterfly

(ii) Classify S_1, S_3, S_5, and S_6 to class level.

S_1 — Class Insecta
S_3 — Class Insecta
S_5 — Class Diplopoda
S_6 — Class Insecta

(iii) State two economic importances of specimen S_2.

1. Improves soil aeration and fertility through burrowing and decomposition.
2. Used as bait in fishing and as animal feed.

(b) State two differences between S_4 and S_5.

Feature	**S_4 (Fern)**	**S_5 (Millipede)**
Division/Phylum	Division Pteridophyta	Phylum Arthropoda (Class Diplopoda)
Mode of reproduction	By spores	By laying eggs
Body organisation	Plant body with fronds and rhizomes	Segmented animal with jointed legs