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

733/2B **BIOLOGY 2B**

(ACTUAL PRACTICAL B)

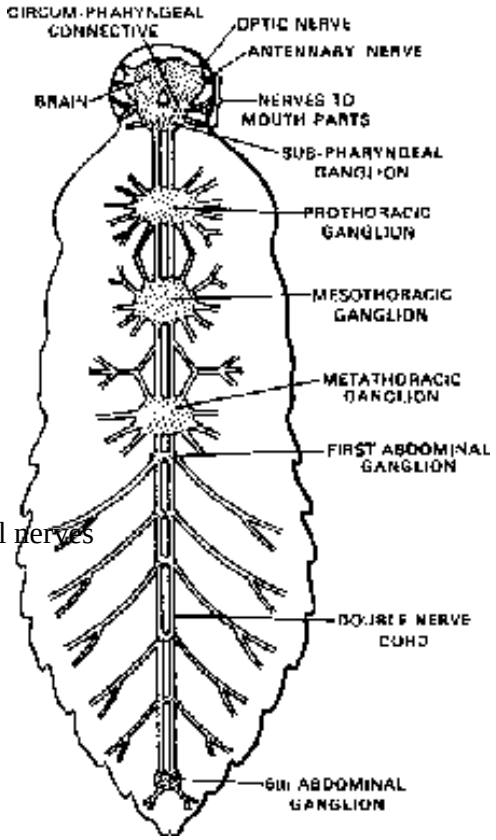
Time: 3 Hours **ANSWERS** **Wednesday, 13th May 2013 a.m**

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 Z. Dissect the specimen in the usual way to display the nervous system.

(a) Draw a well labeled diagram of your dissection.



Answer:
The diagram should display:

- Brain
- Optic nerves
- Subesophageal ganglion
- Ventral nerve cord
- Segmental ganglia
- Nerves extending to limbs and body structures

(b) Which of the labeled nerve in (a) above supplies information to:

(i) Eyes — Optic nerve
(ii) Maxillae and Mandibles — Subesophageal ganglion through lateral nerves

(c) Name the class of specimen Z.

Answer:
Class Insecta

(d) Explain three economic importance of specimen Z.

Answer:

1. Acts as a pest by damaging crops and reducing agricultural productivity.
2. Serves as food for birds, amphibians and reptiles, contributing to food chains.
3. Used in biological research for studies in physiology, anatomy, and ecology.

(e) Give two adaptation features which made specimen Z a successful species among members of the animal kingdom.

Answer:

1. Possession of a chitinous exoskeleton which protects internal organs and prevents desiccation.
2. Ability to produce large numbers of eggs for reproduction ensuring survival of species.

(f) Leave your dissection properly displayed for assessment.

2. You have been provided with 1% starch solution, dilute hydrochloric acid, water bath and 10% iodine solution.

(a) What did you observe when a drop of solution from each test tube was added to a drop of iodine solution on a white tile? Give explanations for each case.

Answer:

- **Test tube 1 (Starch + Amylase):** No blue-black colour (solution remains brownish).
  Explanation: Amylase broke down starch into maltose, so no starch remains to react with iodine.
- **Test tube 2 (Starch + HCl):** Blue-black colour appears.
  Explanation: Acid denatured amylase (if present) and starch was not digested, so it reacted with iodine.
- **Test tube 3 (Starch only):** Blue-black colour appears.
  Explanation: No enzyme present, so starch remained intact and reacted with iodine.

(b) What changes should be made in volume of amylase and starch if:

(i) The reaction is too fast?
Answer: Decrease the volume of amylase or increase starch concentration.

(ii) The reaction is too slow in test tube labeled 1?
Answer: Increase the volume of amylase or reduce starch concentration.

(c) Identify the changes in amylase actions which would occur when the temperature is:

(i) Lowered to 10°C
Answer: Reaction rate decreases because enzyme activity is reduced at lower temperatures.

(ii) Increased to above 40°C
Answer: Amylase is denatured, losing its shape and active site, so no digestion occurs.

(d) Briefly explain five properties of amylase as an enzyme.

Answer:

1. It speeds up the breakdown of starch into maltose.
2. It is a protein in nature.
3. It works best at an optimum temperature of 37°C.
4. It functions within a specific pH range (neutral to slightly alkaline).
5. It is specific, acting only on starch (its substrate).

3. You are provided with specimen M_1, M_2 and M_3.

(a)

(i) Draw a well labeled diagram of specimen M_1.

Answer:
Diagram should show:

- Foot
- Shell
- Tentacles
- Eye spots
- Head
- Mantle

(ii) Classify specimen M_1 down to class level.

Answer:
Kingdom: Animalia
Phylum: Mollusca
Class: Gastropoda

(iii) Give four reasons for putting specimen M_1 to such class level.

Answer:

1. Presence of a soft unsegmented body.
2. Possession of a coiled or uncoiled shell.
3. Movement by a muscular foot.
4. Presence of a radula for feeding.

(iv) State two economic importance of the specimen.

Answer:

1. Acts as a pest on crops and gardens by feeding on vegetation.
2. Some species are edible and used as food in some cultures.

(b) Study specimen M_2 and M_3 carefully, and answer the following questions, based on the observable morphological structures:

(i) Give three differences between specimen M_2 and M_3.

Feature	**M_2**	**M_3**
Body shape	Bilaterally symmetrical	Radially symmetrical
Number of legs/appendages	Many (if arthropod)	None
Presence of segmentation	Present (if arthropod)	Absent

(ii) Give two similarities between specimen M_2 and M_3.

Answer:

1. Both are invertebrates.
2. Both possess soft bodies without internal skeletons.

(c) (i) Identify the phylum of specimen M_1.

Answer:
Phylum Mollusca

(ii) Analyze four adaptive features of specimen M_1.

Answer:

1. Coiled shell provides protection from predators and harsh environment.
2. Muscular foot enables locomotion and burrowing.
3. Moist skin allows cutaneous respiration in damp environments.
4. Radula enables scraping of food particles from surfaces.