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

733/1 **BIOLOGY 1**

Time: 3 Hours **ANSWERS** **Year: 2023**

Instructions.

1. This paper consists of sections A and B with a total of **Fourteen (14)** questions.
2. Answer **all** questions from section A and **four (4)** questions from section B.
3. Section A carries **forty (40)** marks and section B Carries **sixty (60)** marks.
4. Cellular phones are **note** allowed in the examination room.
5. Write your **examination Number** on every page of your answer booklet(s).

SECTION A (40 Marks)

Answer all questions from this section. Each question carries 4 marks.

1. Classify the following organisms from phylum/division to class level

(a) **Moss**
Division: Bryophyta
Class: Bryopsida

(b) **Crab**
Phylum: Arthropoda
Class: Crustacea

(c) **Water lily**
Division: Angiospermophyta
Class: Monocotyledonae

(d) **Amoeba**
Kingdom: Protista (as it's not in a plant or animal phylum)
Class: Rhizopoda

2. Validate the statement by giving two points that cells of cold-blooded animals have high proportion of unsaturated fatty acids than those of warm-blooded animals

First, the reason: cold-blooded animals (ectotherms) rely on external temperatures to regulate body heat, so their cell membranes must remain flexible in varying temperatures.

i) **Unsaturated fatty acids remain fluid at lower temperatures** because their double bonds create kinks that prevent tight packing of lipid molecules, maintaining membrane flexibility.

ii) **Higher unsaturated fatty acids improve cell function in cold conditions**, allowing enzymes and membrane proteins to work efficiently even as environmental temperatures drop.

3. Four possible factors that affect Basal Metabolic Rate (BMR)

i) **Age**: BMR decreases as one ages because muscle mass reduces and metabolic processes slow down.

ii) **Body size and composition**: Larger bodies or those with more muscle mass have a higher BMR since muscle tissue consumes more energy than fat.

iii) **Gender**: Males typically have a higher BMR than females due to more muscle mass.

iv) **Hormonal factors**: Hormones like thyroxine (from the thyroid gland) can increase or decrease BMR.

4. Explain the need for producers, consumers, detritivores and decomposers in the biotic component of an ecosystem

Producers (like plants) convert solar energy into chemical energy through photosynthesis, forming the base of the food chain.

Consumers (like animals) depend on producers and other consumers for food and energy.

Detritivores (like earthworms) feed on dead organic matter, helping break it down into smaller particles. **Decomposers** (like bacteria and fungi) complete the breakdown process by converting dead matter into nutrients that return to the soil for plant uptake, maintaining ecosystem balance.

5. Explain the importance of providing care and support to people living with HIV/AIDS infections
i) **Improves physical and emotional wellbeing**, helping them live healthier and more productive lives.

ii) **Reduces stigma and discrimination**, encouraging them to seek treatment and remain socially engaged.

iii) **Promotes adherence to medication and medical care**, increasing life expectancy.

iv) **Prevents further spread of the virus** through awareness and safe practices encouraged by support systems.

6. Explain four necessities of teacher's guide to student teachers during Block Teaching Practice (BTP)
i) **Provides organized lesson structures and schemes of work** to follow when preparing lessons.

ii) **Offers suggested teaching strategies and methods** suitable for specific topics and learners.

iii) **Includes assessment tools and sample exercises** to help student teachers evaluate learning outcomes.

iv) **Guides in managing classroom challenges** and maintaining professional teaching conduct.

7. Explain strategies to be used to promote students' active participation in learning
i) **Use of group discussions and cooperative learning** where learners share ideas and solve problems together.

ii) **Incorporating practical activities and experiments** that relate theory to real-life experiences.

iii) **Asking open-ended and thought-provoking questions** to stimulate critical thinking.

iv) **Using educational games and role-playing** to make lessons engaging and interactive.

8. Explain ways used to facilitate practical session on dissection of a cockroach in a school where there are no laboratory facilities

i) **Use of preserved cockroaches or models** to demonstrate anatomical features.

ii) **Providing detailed charts, diagrams and posters** showing the internal and external structures.

iii) **Utilizing videos or virtual simulations** of dissection procedures via a smartphone or projector.

iv) **Organizing group discussions and quizzes** based on the anatomical structures and their functions.

9. Explain four limitations of using real objects as best media in actual biology classroom
i) **May not always be available or accessible**, especially for rare or perishable specimens.

ii) **Some objects could pose safety hazards** (e.g. venomous, toxic, or allergenic specimens).

iii) **Difficult to preserve over time**, especially plants and animal organs.

iv) **Handling limitations in large classes** where not every learner can engage with the object directly.

10. Observe the figure and then answer the questions asked
(a) Which concept in teaching does the figure represent?

Microteaching . a teaching practice strategy where student teachers prepare and present short lessons to peers for feedback and reflection.

(b) Identify two curriculum materials required for the student teacher to carry out in stage II
i) **Syllabus** for identifying objectives and content

ii) **Teacher's guide** for suggested methods and teaching aids

(c) How important are the activities at stage IV to the student teacher? Give two points.

i) **Provides constructive feedback** that helps the student teacher improve teaching skills and techniques.

ii) **Encourages reflection on teaching practices**, enabling self-assessment and adjustment for future lessons.

SECTION B (60 Marks)

Answer all questions from this section. Each question carries 15 marks.

11. Explain in six points the contribution of Biotechnology towards industrial economic development in Tanzania

Improvement in Agriculture Productivity: Through biotechnology, disease-resistant and high-yielding crop varieties like maize, cassava, and rice have been developed, increasing food security and surplus for industrial raw materials.

Production of Industrial Enzymes: Biotech industries use microorganisms to produce enzymes used in food processing, detergents, leather treatment, and textile industries, reducing the need for expensive imported chemicals.

Pharmaceutical Manufacturing: Biotechnology has enabled local production of vaccines, antibiotics, and diagnostic kits, cutting costs on medical imports and improving healthcare, which indirectly boosts workforce productivity.

Waste Management and Bioremediation: Microorganisms are used to treat industrial and domestic waste, reducing environmental pollution and making industrial areas safer and sustainable for long-term investment.

Biofuel Production: Development of biofuels like biogas and bioethanol from agricultural waste has diversified Tanzania's energy sources, reducing reliance on imported fuels and supporting rural industrialization.

Employment Creation: Biotechnology industries have generated job opportunities in research labs, farms, processing industries, and academic institutions, contributing to economic empowerment.

12. Justify six aspects showing beneficial and detrimental economic importance of bacteria to human and other organisms

Beneficial Aspects:

Food Industry: Bacteria like *Lactobacillus* are used in the production of yogurt, cheese, and fermented vegetables, supporting food industries and farmers.

Pharmaceutical Production: Bacteria are involved in producing antibiotics (e.g. *Streptomyces* for streptomycin) and vaccines, saving lives and reducing healthcare costs.

Agriculture: Nitrogen-fixing bacteria (e.g. *Rhizobium*) improve soil fertility naturally, reducing the cost of chemical fertilizers.

Detrimental Aspects:

Food Spoilage: Bacteria like *Clostridium* and *Salmonella* cause spoilage of food products, leading to financial losses in food industries.

Human and Animal Diseases: Pathogenic bacteria such as *Mycobacterium tuberculosis* and *Brucella* cause diseases that reduce human and livestock productivity.

Material Damage: Certain bacteria corrode metals and spoil industrial materials like leather, causing damage in manufacturing and storage facilities.

13. Develop six safety precaution measures that a student should follow to reduce accidents during practical session on food test

Wear protective clothing, including lab coats and safety goggles to prevent contact with harmful chemicals.

Handle all reagents carefully, avoiding direct skin contact and inhalation of fumes.

Label all test tubes and beakers clearly to avoid confusion and accidental ingestion or misuse of chemicals.

Dispose of used reagents and materials properly in designated disposal containers, not in open sinks or trash.

Wash hands thoroughly with soap and water after completing practical activities to remove any chemical residues.

Avoid eating or drinking in the laboratory to prevent accidental ingestion of toxic substances.

14. Prepare an observation checklist with seven points to observe during assessment of the biology practical, which require the students to dissect a cockroach and display its digestive system

Observation Checklist

No	Assessment Item	Tick (✓)
1	Correct positioning of the cockroach for dissection	
2	Proper handling and use of dissection tools	
3	Identification of major digestive organs (crop, gizzard, stomach, caeca, etc.)	
4	Neatness and accuracy of the dissection cut	
5	Proper disposal of biological materials after the experiment	
6	Ability to label identified parts correctly on a diagram	
7	Observance of laboratory safety rules throughout the practical	