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

733/1 **BIOLOGY 1**

Time: 3 Hours **ANSWERS** **Year: 2021**

Instructions.

1. This paper consists of sections A, B and C with a total of **Sixteen (16)** questions.
2. Answer **all** questions from section A and **two (2)** questions from section B and C.
3. Section A carries **forty (40)** marks and section B and C 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. Give the meaning of the terms:

   (a) Basal Metabolic Rate (B.M.R) is the minimum amount of energy required by an organism to maintain basic life processes such as breathing, circulation, and cell function when at rest.

   (b) Respiratory quotient is the ratio of the volume of carbon dioxide produced to the volume of oxygen consumed during respiration for a given substrate.

   (c) Glycolysis is the first stage of cellular respiration where glucose is broken down into two molecules of pyruvate, producing a small amount of energy in the form of ATP, and occurs in the cytoplasm.

   (d) Fermentation is an anaerobic process where glucose is broken down by enzymes to produce energy without the use of oxygen, resulting in products like ethanol or lactic acid.

2. (a) Give the importance of biological keys in classification.

   Biological keys help scientists and learners identify and classify organisms accurately by following a step-by-step guide based on physical characteristics.

   They simplify the process of distinguishing between closely related species by using simple, observable features.

   Biological keys support scientific documentation by ensuring newly discovered organisms are correctly named and classified.

   (b) State three significance of scientific naming of organisms.

   It reduces confusion caused by local names by providing a universal name understood globally.

   Scientific naming reflects evolutionary relationships, showing how closely or distantly related different organisms are.

   It simplifies communication among scientists from different regions or languages by using standardized names.

3. (a) Explain the way enzymes speed up the rate of reaction.

   Enzymes lower the activation energy required for a chemical reaction to occur by binding to the substrate and forming an enzyme-substrate complex that facilitates the conversion to products more efficiently.

   (b) Describe the effect of substrate concentration on the rate of an enzyme-controlled reaction.

   As substrate concentration increases, the rate of reaction rises proportionally because more enzyme active sites are occupied, but after reaching a saturation point, adding more substrate has no effect as all enzyme active sites are already engaged.

4. (a) Copy the following diagram and write the names of the appropriate trophic levels in an ecosystem.

   Producer
   → Primary consumer
   → Secondary consumer
   → Tertiary consumer

(b) Explain the reasons for the links in a food chain to oftenly being three.

Energy is lost at each trophic level through processes like respiration and heat, reducing the amount available for the next level.

There is a decrease in biomass as one moves up the food chain, limiting the number of organisms that can be supported at higher levels.

Longer chains are unstable as a disturbance at one level affects all others more severely.

5. Explain the importance of providing cooperative learning tasks to students in four points.

It encourages teamwork and collaboration by allowing students to share knowledge and skills while solving problems together.

Cooperative tasks build communication skills as students discuss ideas and negotiate roles during learning activities.

They promote peer teaching where students learn effectively by explaining concepts to each other.

Such tasks enhance motivation and engagement as learners feel supported and challenged in a group setting.

6. Outline four purposes that a teachers' manual serves.

It provides lesson objectives, content, and suggested teaching methods to guide the teacher during instruction.

The manual offers assessment tools like sample questions and activities to evaluate learner understanding.

It ensures consistency in lesson delivery by providing a structured framework across different teachers and schools.

It acts as a reference for selecting appropriate teaching and learning resources.

7. Give four differences between micro teaching and block teaching.

Micro teaching involves teaching a short lesson to a small group of peers or students, while block teaching involves teaching several complete lessons to actual classes over an extended period.

Micro teaching focuses on practicing specific teaching skills in a controlled setting, whereas block teaching applies a full teaching program in real classroom conditions.

Feedback in micro teaching is immediate and detailed since it involves a small group and supervisors, while in block teaching feedback comes later after observing full lessons.

Micro teaching requires less time and resources, while block teaching needs detailed lesson planning, preparation, and classroom management.

8. Explain briefly the terms:

(a) A valid test is an assessment tool that measures what it is intended to measure accurately.

(b) A reliable test consistently gives the same results when administered to the same group under similar conditions.

(c) A standardized test is a test designed, administered, and scored in a consistent, uniform manner for all candidates.

(d) A moderated test is a test that has been reviewed and adjusted by experts to ensure fairness, clarity, and appropriate difficulty before being given to students.

9. Analyze four common symptoms of STI/STDs.

Unusual discharge from the genitals, often with a bad smell or abnormal color.

Pain or burning sensation when passing urine.

Itching, sores, or rashes around the genital area.

Swelling or tenderness in the groin region and sometimes fever.

10. Use letters T for tall and t for short to identify the phenotypes and genotypes of F1 generation resulted from the heterozygous tall parents.

Parents: Tt × Tt

Possible Genotypes in F1: TT, Tt, Tt, tt

Phenotypes:
TT = Tall
Tt = Tall
Tt = Tall
tt = Short

So, three tall and one short.

SECTION B (30 Marks)

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

11. (a) Describe three distinctive features of each phylum of Kingdom Fungi.

Zygomycota fungi produce non-septate hyphae, meaning their hyphae lack cross walls. They reproduce sexually by forming zygospores and asexually by sporangiospores. Most of them are terrestrial and grow on decaying organic matter.

Ascomycota fungi have septate hyphae and reproduce sexually by forming ascospores inside sac-like structures called asci. They also reproduce asexually by conidiospores and are commonly found on decaying matter, plants, or animals.

Basidiomycota fungi reproduce sexually by forming basidiospores on club-shaped structures called basidia. They have septate hyphae and often produce large, visible fruiting bodies like mushrooms and puffballs.

(b) Analyse five economic importance of Kingdom Fungi.

Fungi play a major role in decomposition by breaking down dead organic matter, releasing nutrients back into the soil for plant growth.

Some fungi are used in food production industries, such as yeast in bread making and fermentation of alcoholic beverages.

Fungi like Penicillium are sources of antibiotics, which are crucial in modern medicine for treating bacterial infections.

Certain edible fungi like mushrooms are cultivated and sold as nutritious food sources and export commodities.

Fungi cause plant diseases like rusts and smuts, which can affect crop production and lead to economic losses in agriculture.

12. Explain six functions of lipids in the body of a living thing.

Lipids act as a major energy reserve, providing more energy per gram than carbohydrates or proteins when metabolized.

They form essential components of cell membranes, maintaining structure and regulating the passage of substances in and out of cells.

Lipids insulate the body against heat loss, especially in mammals living in cold environments.

They protect internal organs by cushioning and surrounding delicate tissues like the kidneys and heart.

Some lipids serve as precursors for the synthesis of hormones such as steroid hormones involved in various body functions.

Lipids assist in the absorption of fat-soluble vitamins A, D, E, and K within the digestive system.

13. Study carefully the pedigree showing inheritance of a certain trait and answer questions that followed:

(a) Determine the genotypes and phenotypes of individual parents numbered 1, 2, 3, 4 and 5.

Since the pedigree was not provided, a general guide would be:
If the trait is dominant, individuals with the trait have at least one dominant allele.
If recessive, affected individuals have two recessive alleles, while carriers have one.
Parents' genotypes can be deduced by the inheritance pattern shown.

(b) What type of inheritance is displayed by the pedigree?

Without the specific diagram, typically this can either be autosomal dominant, autosomal recessive, X-linked dominant, or X-linked recessive based on how the trait appears in males and females across generations.

(c) Suggest two traits transmitted in a manner similar to the given pedigree.

Sickle cell anaemia and albinism are examples of traits typically transmitted through autosomal recessive inheritance patterns.

SECTION C (30 Marks)

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

14. Explain seven purposes that a syllabus serves in the teaching and learning process.

A syllabus provides a clear outline of topics and content to be covered, ensuring teachers and learners focus on relevant subject matter.

It sets learning objectives that guide teachers on what learners are expected to achieve at the end of each topic or course.

The syllabus determines the sequence in which topics should be taught, ensuring concepts build progressively from simple to complex.

It serves as a basis for selecting appropriate teaching methods, resources, and assessment techniques.

The syllabus informs the design of schemes of work, lesson plans, and assessment tools, ensuring alignment with national education standards.

It helps teachers allocate time appropriately for different topics and learning activities throughout the academic year.

A syllabus promotes fairness by ensuring all students are taught the same core content, providing equal learning opportunities.

15. (a) Identify three challenges of using computer aided programs in the teaching and learning of Biology.

Limited access to computers and internet facilities in some schools restricts effective integration of computer-based learning.

Lack of adequate training for teachers on how to effectively use computer-aided programs in lesson delivery.

Some Biology concepts require practical experiments, which cannot be fully substituted by computer simulations.

(b) Suggest five ways which could be used to make information retrieved from the internet useful in class.

Teachers should verify the accuracy and reliability of information before using it in class to avoid misleading learners.

Incorporating online animations, diagrams, and videos to explain complex biological processes and structures.

Using the internet to access recent scientific discoveries and integrate them into classroom discussions.

Encouraging students to conduct guided internet research projects on specific Biology topics and present their findings.

Using online Biology quizzes and games to reinforce lesson content and assess student understanding interactively.

16. Suggest six strategies that will promote family and community involvement in the teaching and learning of Biology.

Organizing open days or exhibitions where students showcase Biology projects and invite family and community members to participate.

Engaging parents in supporting students' field trips, environmental clean-ups, or tree-planting exercises related to Biology.

Inviting community health workers and agricultural officers to give talks on topics like nutrition, disease prevention, and environmental conservation.

Encouraging parents to assist with providing materials like seeds, seedlings, or small tools for school gardens and practical lessons.

Using local knowledge and experiences by involving elders to explain traditional medicine, farming methods, and environmental management.

Creating Biology clubs that include family and community representatives in activities such as debates, science fairs, and awareness campaigns.