THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

033/1 **BIOLOGY 1**

(For Both School and Private Candidates)

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

Instructions

1. This paper consists of sections A, B and C with a total of eleven (11) questions.
2. Answer all the questions in the sections A and B and two (2) questions from section C.
3. Section A carries sixteen (16) marks, section B fifty four (54) marks and section C carries thirty (30) marks.
4. All writing should be in blue or black pen, except for diagrams that must be drawn in pencil.
5. Communication devices and any unauthorised materials are not allowed in the examination room.
6. Write your Examination Number on every page of your answer booklet(s).

SECTIONA (16 Marks)

Answer all questions in this section.

Question 1.

i	ii	iii	iv	v	vi	vii	viii	ix	x
A	B	B	C	D	A	A	C	E	C

2. Match the functions of the parts of the ear in list A with their corresponding parts in List B by Writing the letter of the correct response beside the item number in the answer booklet provided.

			Pinna
(i)	Maintains body posture and balance. **H**	A	Eustachian tube
(ii)	Carries nerve impulses from the inner ear to the brain. **D**	B	Eardrum
(iii)	Transmits and magnifies sound vibrations. **F**	C	Auditory nerve
(iv)	Converts sound vibrations to nerve impulses. **G**	D	Auditory meatus
(v)	Collects sound waves from the environment. **A**	E	Ossicles
(vi)	Balances pressure on both sides of the tympanic membrane. **B**	F	Cochlea
		G	Semicircular canal
		H	

SECTION B (54 Marks)

Answer all questions in this section.

3. Suppose your friends have been diagnosed with indigestion problem.

(a) What would be the major possible causes of this problem? Provide three points.

ANS:

- **eating or eating too quickly**
- **Eating fatty or spicy food**
- **Too much caffeine, alcohol, chocolate or carbonated beverage**
- **Anxiety**
- **Certain antibiotics, pain reliever and supplements**

(b) Suggest four measures you would recommend to them to avoid the problem in future.

ANS:

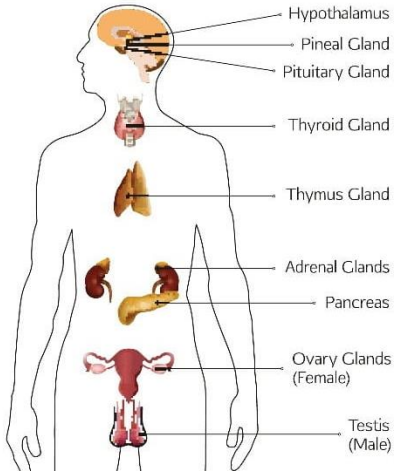
- **Avoid food that trigger indigestion**
- **Eating small meal a day instead of three large meals**
- **Reduce or eliminate use of alcohol and caffeine**
- **Finding alternatives for medicine that triger indigestion**

4. Suggest six ways to minimize the occurrence of miscarriage to the pregnant woman.

ANS:

- **Maintain a healthy diet**: Ensure a balanced intake of essential nutrients such as folic acid, iron, and calcium.
- **Avoid harmful substances**: Refrain from smoking, alcohol, and drugs.
- **Manage stress levels**: Practice relaxation techniques like meditation or yoga.
- **Regular prenatal check-ups**: Monitor pregnancy health and detect issues early.
- **Avoid heavy lifting or strenuous activities**: Prevent undue physical stress.
- **Treat underlying health conditions**: Proper management of issues like hypertension or diabetes

5. (a) Draw a diagram of human body and show the location of the thyroid gland, adrenal gland, pancreas gland and pituitary gland.



https://www.cincinnatichildrens.org/health/e/endocrine

(b) Explain the role of the two hormones produced by the pancreas gland.

ANS:

- **Insulin**: Regulates blood sugar by helping cells absorb glucose.
- **Glucagon**: Raises blood sugar levels by converting stored glycogen into glucose.

6. (a) Briefly explain the given terms as used in genetics:

ANS:

- **Sex-limited characters**: Traits that appear only in one sex due to hormonal differences (e.g., milk production in female mammals).
- **Sex-linked characters**: Traits controlled by genes on the sex chromosomes, such as color blindness (X-linked).
- **Sex-influenced characters**: Traits that are expressed differently in males and females due to hormonal influence, like male-pattern baldness

(b) Differentiate incomplete dominance from codominance.

ANS:

Incomplete dominance: The offspring's phenotype is a blend of the parents (e.g., red and white flowers produce pink).

Codominance: Both parental traits are fully expressed (e.g., AB blood type where both A and B are equally expressed).

7. Briefly explain six factors which affect the rate of physical deterioration of human being.

ANS:

- **Aging**: Natural wear and tear of body cells over time.
- **Poor nutrition**: Deficiencies lead to weak immune and organ systems.
- **Lack of exercise**: Sedentary lifestyle accelerates muscle and bone loss.
- **Chronic diseases**: Conditions like diabetes or arthritis hasten deterioration.
- **Environmental factors**: Pollution or exposure to harmful substances.
- **Stress and mental health**: High stress can lead to physical ailments

8. (a) Draw a diagram of the reproductive structures of a branch of pine tree and label its two parts.

https://www.dreamstime.com/branch-pine-green-needles-male-female-cones

(b) Explain three advantages of the pine trees.

ANS:

Environmental Benefits:

- Pine trees are excellent for the environment as they absorb carbon dioxide and release oxygen, helping to combat climate change.
- They prevent soil erosion because their roots bind the soil, especially in hilly areas.

Economic Value:

- Pine trees provide timber used for construction, furniture, and paper production.
- Their resin is a source of turpentine and other valuable products used in manufacturing.

Aesthetic and Recreational Use:

- Pine forests offer natural beauty, attracting tourism and outdoor activities like hiking and camping.
- Pine trees are often used as Christmas trees, adding cultural and festive value.

SECTION C (30 Marks)
Answer two (2) questions from this section.

9 . Poor waste disposal creates problems in the environment. In six points, justify this statement.

ANS:

Waste disposal refers to the process of managing and discarding unwanted materials, whether through recycling, landfills, or incineration. Proper waste management is essential for maintaining a clean and sustainable environment. However, poor waste disposal, which occurs when waste is improperly handled or discarded, creates numerous environmental and health problems. This essay will justify this statement by outlining six key problems caused by improper waste disposal.

One major issue is **water pollution**. When waste, such as chemicals, plastics, and untreated sewage, is dumped into rivers and oceans, it contaminates water sources. This threatens aquatic life and renders water unsafe for human use. Poor waste disposal also leads to soil degradation. Toxic chemicals from improperly disposed waste seep into the soil, reducing fertility and harming plant growth.

Air pollution is another consequence of poor waste management. Burning waste, especially plastics, releases harmful gases like carbon dioxide and dioxins into the atmosphere. These gases contribute to respiratory diseases and global warming. Furthermore, the improper disposal of organic waste, such as food and animal waste, attracts pests like rats and mosquitoes, leading to the spread of diseases like malaria and cholera.

Wildlife is also negatively affected by waste pollution. Animals may ingest harmful materials, such as plastics, or become trapped in discarded waste, leading to injuries or death. Additionally, ecosystems are disrupted when waste alters habitats, reducing biodiversity. Finally, poor waste management harms the beauty of our surroundings. Littered streets and polluted environments lower the quality of life and discourage tourism.

In conclusion, poor waste disposal results in water and soil pollution, air contamination, disease outbreaks, harm to wildlife, and reduced aesthetic value. Addressing this issue requires collective efforts from individuals, governments, and organizations to adopt sustainable waste management practices. Proper waste disposal is key to preserving the environment for future generations

10 Analyse six features that make the human heart to pump blood efficiently.

ANS:

The human heart is a vital organ that functions as a pump to circulate blood throughout the body. It ensures that oxygen and nutrients are delivered to cells while removing waste products like carbon dioxide. The heart's structure and specialized features allow it to perform this role efficiently. This essay will analyze six key features that enable the heart to pump blood effectively.

One important feature is the **strong muscular walls of the heart**, especially the ventricles. The left ventricle, in particular, has thick walls that generate the force needed to pump blood to the entire body. Another critical feature is the presence of valves, such as the tricuspid, mitral, and semilunar valves. These valves ensure one-way blood flow, preventing backflow and maintaining proper circulation.

The heart's ability to contract rhythmically is another key feature. The sinoatrial (SA) node, often referred to as the heart's natural pacemaker, regulates these

contractions, ensuring a consistent and coordinated heartbeat. Elastic arteries, such as the aorta, play a supportive role by expanding and recoiling with each heartbeat. This helps to maintain steady blood pressure and smooth blood flow.

Double circulation is another feature that enhances efficiency. Blood is first pumped to the lungs to receive oxygen and then circulated to the rest of the body. This ensures that tissues receive oxygen-rich blood. Lastly, the left ventricle's thick muscular walls generate higher pressure compared to the right ventricle, enabling it to pump blood over long distances, such as to the brain and legs.

In conclusion, the heart's muscular walls, valves, rhythmic contractions, elastic arteries, double circulation, and left ventricle strength make it an incredibly efficient pump. These features work together to ensure the continuous circulation of blood, highlighting the heart's essential role in sustaining life.

11. One of the students was diagnosed with malaria. Suggest five measures to be taken by the victim to avoid that disease in the future.

ANS:

Malaria is a life-threatening disease caused by parasites transmitted through the bites of infected female Anopheles mosquitoes. It is preventable and treatable, yet it remains a major health concern in many parts of the world, particularly in tropical regions. Preventing malaria involves minimizing exposure to mosquito bites and reducing mosquito populations. This essay discusses five effective measures to prevent malaria in the future.

One of the most effective ways to prevent malaria is **by using insecticide-treated mosquito nets**. Sleeping under these nets provides a physical and chemical barrier against mosquito bites, especially at night when mosquitoes are most active. Another preventive measure is applying mosquito repellents to exposed skin and clothing. This helps deter mosquitoes during outdoor activities, particularly in high-risk areas.

Eliminating stagnant water sources around living areas is another essential step. Mosquitoes breed in standing water, so removing containers, draining puddles, and covering water storage tanks can significantly reduce their population. Additionally, individuals can take prophylactic antimalarial drugs when traveling to malaria-endemic regions. These medications provide protection against infection, even if a mosquito bite occurs.

Wearing protective clothing, such as long-sleeved shirts and pants, further minimizes the risk of mosquito bites. This measure is particularly useful in the early evening and at night, when mosquitoes are most active. Combined with the other measures, this provides comprehensive protection against malaria.

In conclusion, malaria prevention requires a multifaceted approach, including using mosquito nets, applying repellents, eliminating breeding grounds, taking preventive medication, and wearing protective clothing. By adopting these measures, individuals and communities can significantly reduce the risk of malaria and contribute to a healthier, disease-free environment.