

553/1
BIOLOGY
Paper 1
July /
Aug
2024 2 ½
HOURS

YAAKA EXAMINATIONS

INSTRUCTIONS TO CANDIDATES

*This paper consists of **seven** examination items. It has two sections; **A** and **B**. Section **A** has **three** compulsory items. Section **B** has two Parts; **I** and **II**. Answer **one** item from each part. Answer **five** items in all. Any additional item(s) answered will not be scored.*

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SECTION	ITEM	SCORE(S)	EXAMINER'S SIGNATURE
A	1		
	2		
	3		
B	4		
	5		
	6		
	7		
TOTAL			

Section A: Compulsory Items

Item 1:

Due to a recent outbreak of a bacterial infection, several schools in Uganda were closed temporarily. The bacteria were found in contaminated drinking water from shared sources in the community.

Task

1. Identify the challenges that led to the contamination of water sources.
2. Explain how bacteria can multiply in water and affect human health.
3. Suggest preventive measures that could be taken to ensure safe drinking water in schools.

Item 2:

Jacob, a farmer in Mbale, noticed that his cows had significantly reduced milk production during a prolonged dry season. He relied mainly on natural grazing, and water for the animals was scarce.

Task

1. How does the availability of water affect milk production in dairy cows?
2. Explain the physiological processes in cows that are affected by dehydration.
3. Propose strategies that Jacob could implement to maintain milk production during drought.

Item 3:

With increasing urbanization, wetlands around Kampala have been encroached upon for construction, leading to frequent flooding during rainy seasons.

Task

1. Describe the role of wetlands in managing floodwater.
2. Discuss the ecological consequences of wetland encroachment.
3. Suggest measures to protect and restore wetlands in urban areas.

Section B: Part I - Choose one item

Item 4:

The Ugandan government is promoting bee farming as a way of boosting incomes and conserving the environment. However, pesticide use in crop farming has affected bee populations.

Task

Discuss the importance of bees in the ecosystem and agriculture and propose ways to mitigate the impact of pesticides on bee populations.

Item 5:

A new strain of banana wilt has been reported in Western Uganda, affecting banana plantations, a staple food and key source of income for many households.

Task

Evaluate the impact of banana wilt on food security and suggest integrated disease management strategies to control its spread.

Part II - Choose one item**Item 6:**

Deforestation in the Albertine Rift Valley is affecting biodiversity, leading to the loss of unique species and disrupting local climate patterns.

Task

Analyze the impact of deforestation on biodiversity and propose reforestation techniques that could restore ecological balance.

Item 7:

Waste management is a major issue in Kampala city, with heaps of uncollected garbage piling up in residential areas, leading to health and environmental hazards.

Task

Evaluate the impact of poor waste management on urban health and suggest a sustainable waste management system for the city.

MARKING GUIDE TO THE ABOVE TASKS

Section A: Compulsory Items

Item 1: Water Contamination by Bacteria

1. Challenges leading to water contamination:

- Poor sanitation and improper waste disposal allow fecal matter and other pollutants to seep into water sources.
- Lack of proper water treatment facilities.
- Shared water sources in communities can easily be contaminated by human activities like washing, bathing, and disposal of waste near water points.

2. Bacterial Multiplication and Health Effects:

- Bacteria multiply rapidly in warm, nutrient-rich environments such as untreated water.
- When consumed, these bacteria can cause diseases like cholera, typhoid, and dysentery by infecting the digestive system, leading to symptoms like diarrhea, vomiting, and dehydration.

3. Preventive Measures:

- Regular treatment of drinking water with chlorine or boiling.
- Educate communities on proper sanitation and waste disposal.
- Build proper drainage systems and avoid open defecation.

Item 2: Water Scarcity and Dairy Cows

1. Effect of Water on Milk Production:

- Water is crucial for hydration and proper metabolic functioning in cows, especially for lactation.
- Scarcity of water leads to dehydration, reducing milk volume and quality since water forms a large component of milk.

2. Physiological Processes Affected by Dehydration:

- Reduced water intake affects blood circulation and nutrient transportation to mammary glands, leading to reduced milk synthesis.
- Dehydration also impairs digestion, nutrient absorption, and general metabolic efficiency.

3. Strategies for Sustaining Milk Production:

- Jacob can invest in water storage systems to collect rainwater during the rainy season.
- Supplement grazing with high-quality feed and silage during dry periods.
- Use drought-resistant fodder crops that require less water.

Item 3: Wetland Encroachment and Flooding

1. Role of Wetlands:

- Wetlands absorb excess rainwater, reducing the risk of floods by slowly releasing water into the environment.
- They act as natural sponges and help to maintain the water table.

2. Ecological Consequences of Wetland Encroachment:

- Loss of biodiversity as many species lose their natural habitat.
- Increased soil erosion and water contamination as wetlands filter pollutants from surface runoff.
- Altered local climate patterns and reduced water retention during dry seasons.

3. Measures to Protect Wetlands:

- Enforce strict land use regulations to prevent construction on wetlands.
- Implement community-based wetland restoration programs, including replanting native vegetation.
- Raise awareness about the importance of wetlands through education and campaigns.

Section B: Part I

Item 4: Importance of Bees in Ecosystems and Mitigating Pesticide Impact

1. Importance of Bees:

- Bees are essential pollinators for many crops, ensuring food security through the pollination of fruits, vegetables, and other crops.
- They contribute to biodiversity by supporting the reproduction of flowering plants.
- Bees play a crucial role in ecosystem stability by facilitating plant reproduction, which supports various animal species.

2. Ways to Mitigate Pesticide Impact:

- Encourage the use of organic or bee-friendly pesticides that do not harm pollinators.
- Implement integrated pest management (IPM) to reduce the reliance

on chemical pesticides.

- Create buffer zones of natural vegetation around crop fields to protect bees from pesticide exposure.

Item 5: Banana Wilt and Food Security

1. Impact on Food Security:

- Banana wilt leads to a significant loss of crop yield, affecting staple food availability in households.
- It reduces income for farmers who rely on bananas as a source of livelihood, leading to economic challenges.
- Food shortages can exacerbate malnutrition in regions heavily dependent on bananas for dietary needs.

2. Integrated Disease Management Strategies:

- Use of resistant banana varieties to limit the spread of banana wilt.
- Practice crop rotation and proper sanitation in fields to prevent the transfer of pathogens.
- Educate farmers on disease identification and control methods, such as destroying infected plants early.

Section B: Part II

Item 6: Impact of Deforestation on Biodiversity

1. Impact on Biodiversity:

- Deforestation leads to the loss of habitats for numerous species, causing a decline in population and extinction.
- It disrupts ecosystems and food chains, leading to a loss of ecological balance.
- Deforestation alters local climate patterns, making some areas more prone to droughts or floods.

2. Reforestation Techniques:

- Plant native tree species to restore ecological balance and attract wildlife back into the area.
- Encourage agroforestry, where farmers plant trees alongside crops to benefit both agriculture and biodiversity.
- Involve local communities in reforestation efforts to ensure

long-term success.

Item 7: Waste Management in Kampala

1. Impact on Urban Health:

- Uncollected waste attracts rodents, insects, and other disease vectors, leading to outbreaks of diseases like cholera and typhoid.
- Waste clogs drainage systems, causing flooding during rainy seasons, which further spreads waterborne diseases.
- Accumulation of plastic and other non-biodegradable materials degrades the environment and affects air and water quality.

2. Sustainable Waste Management Systems:

- Implement city-wide waste segregation systems where organic waste is composted and recyclable materials are collected separately.
- Encourage the use of biodegradable materials and ban single-use plastics.
- Strengthen garbage collection schedules and infrastructure, and promote public-private partnerships for waste disposal services.



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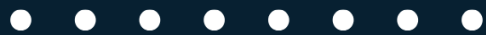
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