

553/1
BIOLOGY
Paper 1
20242 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:

In Northern Uganda, communities heavily depend on the Nile River for their daily water needs. However, increasing industrial activities along the riverbanks have led to water pollution, affecting the health of local residents.

Task

1. Identify the main pollutants likely to be found in the Nile River due to industrial activities.
2. Explain how these pollutants can affect aquatic life and human health.
3. Suggest measures that can be taken to reduce water pollution in the Nile River.

Item 2:

Mariam, a student from Masaka, observed that her family's maize crop yield decreased drastically due to an infestation of armyworms, which have become common in Uganda due to climate change.

Task

1. Describe the impact of armyworms on maize crops.
2. Explain the life cycle of armyworms and how it contributes to their rapid spread.
3. Propose integrated pest management strategies that Mariam's family could use to control armyworms.

Item 3:

In an effort to combat malnutrition, the Ugandan government introduced fortified foods such as vitamin A-enriched cooking oil and maize flour. However, awareness and consumption of these foods remain low in rural areas.

Task

1. Discuss the importance of vitamins in the human diet, particularly vitamin A.
2. Explain the consequences of vitamin A deficiency in children.
3. Suggest ways to increase the consumption of fortified foods in rural communities.

Section B: Part I - Choose one item

Item 4:

The government of Uganda has been encouraging the planting of fruit trees in schools as part of the environmental conservation program and to provide nutritious fruits to students. However, the survival rate of these trees is low due to poor maintenance.

Task

Evaluate the benefits of fruit tree planting in schools and suggest best practices for maintaining and ensuring the survival of these trees.

Item 5:

Lake Bunyonyi in Southwestern Uganda, known for its beauty and unique ecosystem, is facing threats from increasing human activities, including unsustainable farming on steep slopes leading to soil erosion.

Task

Analyze the impact of soil erosion on the lake's ecosystem and propose sustainable farming practices that can be adopted by the local community to protect the lake.

Part II - Choose one item

Item 6:

Uganda has rich biodiversity, but illegal wildlife trade is threatening many species, including elephants and pangolins. The government is implementing policies to curb poaching, but challenges remain.

Task

Discuss the ecological role of elephants and pangolins in Uganda's ecosystems and suggest measures that can be taken to strengthen anti-poaching efforts.

Item 7:

The Kampala City Authority (KCCA) has introduced urban farming as a way to improve food security and reduce the cost of living. However, limited space and poor soil quality pose challenges.

Task

Evaluate the benefits of urban farming in Kampala and suggest innovative solutions to maximize space and improve soil quality for urban farmers.

MARKING GUIDE TO THE ABOVE TASKS

Section A: Compulsory Items

Item 1: Nile River Pollution and Its Impact

1. Main Pollutants Likely to Be Found in the Nile River:

- Industrial waste, including heavy metals like lead, mercury, and cadmium.
- Chemicals from agricultural runoff, including pesticides and fertilizers.
- Untreated sewage from residential areas and factories, which includes organic waste and pathogens.

2. Effects of Pollutants on Aquatic Life and Human Health:

- Pollutants can cause eutrophication, leading to oxygen depletion and the death of aquatic organisms.
- Heavy metals can accumulate in fish and other aquatic animals, posing health risks to humans who consume contaminated seafood.
- Pathogens in untreated sewage can spread waterborne diseases like cholera, typhoid, and dysentery among communities that rely on the Nile for drinking water.

3. Measures to Reduce Water Pollution:

- Enforce stricter regulations on waste disposal by industries to ensure proper treatment of effluents before discharge.
- Promote the use of organic farming practices to reduce chemical runoff into the river.
- Build and maintain sewage treatment plants to ensure that only treated wastewater is released into the river.

Item 2: Armyworms and Maize Crop Infestation

1. Impact of Armyworms on Maize Crops:

- Armyworms feed on maize leaves and stems, reducing photosynthesis and stunting plant growth.
- Severe infestations can lead to total crop destruction, reducing yields and

threatening food security.

- The damage caused by armyworms also increases the vulnerability of plants to other pests and diseases.

2. Life Cycle of Armyworms and Their Spread:

- Armyworms undergo complete metamorphosis, including egg, larva (caterpillar), pupa, and adult moth stages.
- Adult moths lay eggs in large numbers, and the larvae (caterpillars) hatch and begin feeding immediately.
- Their rapid reproduction and ability to move over large distances contribute to their widespread infestations.

3. Integrated Pest Management Strategies:

- Use biological control methods, such as introducing natural predators like birds and parasitic wasps that feed on armyworms.
- Apply environmentally friendly pesticides like neem-based solutions to control infestations.
- Practice crop rotation to disrupt the armyworm life cycle and reduce their habitat.

Item 3: Importance of Vitamin A and Fortified Foods

1. Importance of Vitamin A:

- Vitamin A is essential for maintaining healthy vision, supporting the immune system, and promoting cell growth and reproduction.
- It plays a key role in preventing night blindness and reducing the severity of infections, particularly in children.

2. Consequences of Vitamin A Deficiency:

- In children, vitamin A deficiency can lead to night blindness, weakened immune systems, and increased susceptibility to infectious diseases like measles.
- Severe deficiency can cause complete blindness and increase child mortality rates in communities with malnutrition.

3. Ways to Increase Consumption of Fortified Foods:

- Conduct awareness campaigns in rural areas to educate communities about the benefits of fortified foods.
- Work with local leaders and health workers to promote fortified food distribution

through community health centers.

- Introduce fortified foods in school meal programs to ensure children get essential nutrients.

Section B: Part I

Item 4: Fruit Tree Planting in Schools

1. Benefits of Fruit Tree Planting in Schools:

- Provides a sustainable source of nutritious fruits for students, contributing to better health and nutrition.
- Helps in environmental conservation by promoting biodiversity and reducing carbon emissions through increased tree cover.
- Teaches students about agriculture, environmental stewardship, and the importance of self-sufficiency.

2. Best Practices for Maintaining Fruit Trees:

- Ensure proper irrigation, especially during dry seasons, to maintain tree health.
- Apply organic fertilizers and mulch to improve soil fertility and moisture retention.
- Practice pruning and pest control to encourage healthy growth and prevent infestations.

Item 5: Impact of Soil Erosion on Lake Bunyonyi's Ecosystem

1. Impact of Soil Erosion on the Lake's Ecosystem:

- Soil erosion increases sedimentation in the lake, reducing water quality and affecting aquatic life by clogging fish gills and reducing oxygen levels.
- It disrupts the habitat of fish and other aquatic organisms, leading to a decline in biodiversity.
- Sedimentation can also lead to the shallowing of the lake, reducing its water retention capacity.

2. Sustainable Farming Practices to Prevent Soil Erosion:

- Encourage terracing on steep slopes to reduce surface runoff and prevent soil loss.
- Promote agroforestry, where trees are planted alongside crops to stabilize the soil and reduce erosion.
- Use cover crops to protect the soil from heavy rains and improve soil structure.

Section B: Part II

Item 6: Role of Elephants and Pangolins in Uganda's Ecosystem

1. Ecological Role of Elephants:

- Elephants help shape their ecosystems by creating pathways in forests, which open up habitats for smaller species.
- They play a crucial role in seed dispersal by spreading seeds through their dung, promoting plant biodiversity.

2. Ecological Role of Pangolins:

- Pangolins help control insect populations, particularly ants and termites, which could otherwise damage crops and forests.
- Their burrowing activity aerates the soil, improving soil health and nutrient cycling.

3. Measures to Strengthen Anti-Poaching Efforts:

- Increase surveillance and patrolling in wildlife reserves to prevent illegal hunting.
- Educate local communities about the importance of wildlife conservation and the economic benefits of ecotourism.
- Implement harsher penalties for poachers and illegal traders in wildlife products.

Item 7: Urban Farming in Kampala

1. Benefits of Urban Farming:

- Provides fresh and affordable food for city dwellers, improving food security.
- Reduces transportation costs and emissions associated with importing food from rural areas.
- Offers an income-generating opportunity for urban residents, contributing to poverty reduction.

2. Solutions to Maximize Space and Improve Soil Quality:

- Promote vertical gardening and container gardening to make efficient use of limited space.
- Use organic composting to improve soil quality and reduce dependence on synthetic fertilizers.
- Establish community gardens where residents can collectively grow food and share resources.



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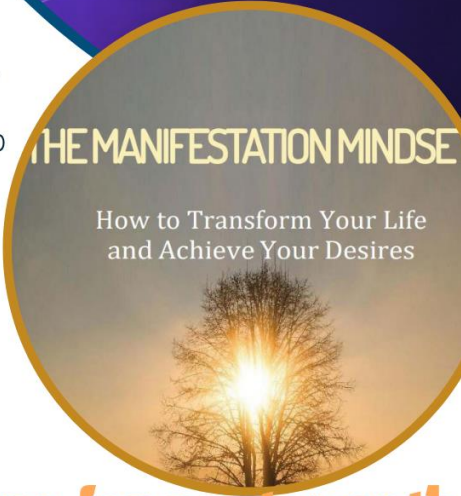
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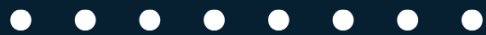
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