



UCE 500/3 General science Paper 2 2024 (biology)

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President of Uganda 2031



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UCE 500/3 General Science Paper 3 2024 (biology)

Time 1hour 30 minutes

Marking guide

Item 1

Fiona built her home in a wetland and uses the resources in the wetland to earn a living. Recently, a big part of the swamp is being used for sand mining and brick making. Her economic activities have been greatly affected and she is always complaining of lack of money. During the rain seasons, her compound floods. Her two-year-old grandchild has developed a pot belly stomach and silky hair. Her family members frequently visit the nearby health center to treat different diseases. All these have made Fiona not to enjoy living in her home.

Task

- (a) Explain why Fiona is no longer enjoying her home.
- (b) Suggest what can be done to conserve the remaining swamp in the community.
- (b) Explain why it is important to conserve the remaining swamp in Fiona's home area.

Suggested answers

(a) Why Fiona is no longer enjoying her home

- (i) **Environmental degradation:** Sand mining and brick making have destroyed parts of the swamp, reducing the natural resources she depended on for her livelihood.
- (ii) **Flooding:** Wetlands normally absorb excess rainwater. With the swamp degraded, her compound floods during rainy seasons.
- (iii) **Economic hardship:** Loss of swamp resources means she can no longer earn enough money, leading to financial stress.
- (iv) **Health problems:** Her grandchild's pot belly and silky hair are signs of **Kwashiorkor**, a protein deficiency disease. Frequent illnesses in her family are linked to poor nutrition and polluted water from swamp destruction.

(b) What can be done to conserve the remaining swamp

- (i) **Stop destructive activities:** Ban sand mining and brick making in the wetland.
- (ii) **Community sensitization:** Educate people on the importance of wetlands.
- (iii) **Reforestation and restoration:** Plant papyrus and other wetland vegetation.
- (iv) **Controlled use:** Allow only sustainable activities like fishing, harvesting reeds, or eco-tourism.
- (v) **Government enforcement:** Strengthen laws and policies to protect wetlands.
- (vi) **Alternative livelihoods:** Support communities with other income sources (beekeeping, poultry, crafts).

(c) Importance of conserving the remaining swamp

- (i) **Flood control:** Wetlands absorb excess rainwater, preventing floods.
- (ii) **Water purification:** They filter pollutants, providing clean water.
- (iii) **Habitat for biodiversity:** Wetlands support fish, birds, and plants.
- (iv) **Livelihoods:** Communities depend on wetlands for food, building materials, and income.
- (v) **Climate regulation:** Wetlands store carbon and help reduce climate change effects.
- (vi) **Health benefits:** Clean water and food security reduce diseases like malnutrition.

Item 2

In preparation for a science fair, students were told to use locally available material. They went to school garden, picked all leaves from young plants of cassava and mangoes. They also removed the bark of mango trees and cassava plants. However, the students could not explain the use of the different plant parts collected to the society. After some time, the farm manager noticed that some plants were not growing well while others appeared stunted.

Task

- (a) Suggest to the students how the different parts of the plants collected were useful to the society.

- (b) Explain how the removal of plant parts affected the plant processes.
- (c) Explain how the plants were able to survive after removal of some parts

Suggested answers

(a) Usefulness of the plant parts collected to society

Cassava and mango leaves:

- Source of food (vegetables, animal fodder).
- Used in traditional medicine.
- Provide shade and oxygen through photosynthesis.

Cassava and mango bark:

- Used in traditional medicine (herbal remedies).
- Provides fibers for ropes and mats.
- Can be used as fuel (firewood).
- Protects the plant from pests, diseases, and water loss.

(b) How removal of plant parts affected plant processes

• Leaves removed:

- Reduced photosynthesis → less food made for growth.
- Reduced transpiration → disturbed water balance.

• Bark removed:

- Damaged transport tissues (phloem and xylem).
- Reduced movement of food and water within the plant.
- Increased vulnerability to pests, diseases, and drying out.

- **Overall effect:** Plants became stunted and weak because their normal life processes were disrupted.

(c) How the plants were able to survive after removal of some parts

- Plants have **many leaves and branches**, so those left behind continued photosynthesis.
- **Roots** still absorbed water and minerals from the soil.
- **Regeneration ability:** Plants can grow new leaves, bark, and shoots to replace lost parts.
- **Resilience:** As long as the damage is not total, plants can adapt and continue growing, though at a slower rate.

Item 3

After giving birth 6months ago, Lydia did not use any family planning method. She has discovered recently that she is pregnant again. Due to this unexpected pregnancy, Lydia has refused to go for antenatal care visits for fear of being laughed at by the community. She also skips meal often due to lack of appetite for food.

Task:

- Explain to Lydia the possible dangers that may arise out of her behavior.
- Advise Lydia on what she can do to have a healthy baby.

Suggested answers

(a) Possible dangers from Lydia's behavior

(i) Skipping antenatal care visits:

- Missed opportunities to detect and manage pregnancy complications (e.g., high blood pressure, anemia, infections).
- Risk of poor growth and development of the baby due to lack of monitoring.
- Increased chance of maternal and infant mortality.

(ii) Skipping meals (poor nutrition):

- Malnutrition can lead to anemia, weakness, and poor immunity in Lydia.

- Baby may suffer from **low birth weight** or developmental problems.
- Increased risk of pregnancy complications such as premature birth.

(iii) Psychological stress:

- Fear of community judgment may cause anxiety or depression, which can affect both mother and baby.

(b) Advice for Lydia to have a healthy baby

(i) Attend antenatal care visits:

- Health workers provide check-ups, supplements (like iron and folic acid), and vaccinations.
- Early detection of complications ensures safe delivery.

(ii) Eat a balanced diet:

- Include proteins (beans, eggs, fish, milk), carbohydrates (posho, rice, potatoes), vitamins (fruits, vegetables), and minerals (greens, milk).
- Drink plenty of clean water.

(iii) Seek emotional support:

- Talk to trusted family members or health workers about her fears.
- Remember antenatal care is confidential and meant to protect her and the baby.

(iv) Practice healthy lifestyle:

- Rest adequately.
- Avoid alcohol, smoking, or harmful substances.

(v) Community awareness:

- Understand that pregnancy is natural, and antenatal visits are encouraged for all mothers regardless of timing.

Item 4

Sowed and John, have both complained that they were not feeling well and have poor vision. They went to the hospital and the Doctor examined each of them. The results showed that Sowed was able to read well only when the object was at a distance and not at a near distance, while John was only able to read well from near distance and not at far distance.

The medical results also revealed that Sowed had high blood sugar levels, and John had high blood pressure.

Task

- (a) Explain to Sowed and John the causes of their defects and how each defect can be corrected.
- (b) Apart from the eye defect conditions, what advice can you give to Sowed and John to manage each of their other respective health conditions.

Suggested answers

(a) Eye Defects and Corrections

Sowed – Hyperopia (Farsightedness)

Cause: Light focuses *behind* the retina because the eyeball is too short or the cornea is too flat.

Symptoms: Clear vision at far distances, blurred vision at near distances, eye strain, headaches.

Correction:

- **Convex lenses (positive power glasses/contacts)** to bend light forward onto the retina.
- **Refractive surgery (LASIK, PRK, lens replacement)** for permanent correction.

John – Myopia (Nearsightedness)

Cause: Light focuses *in front* of the retina because the eyeball is too long or the cornea is too steeply curved.

Symptoms: Clear vision at near distances, blurred vision at far distances, squinting, headaches.

Correction:

- **Concave lenses (negative power glasses/contacts)** to spread light rays so they focus correctly.
- **Refractive surgery (LASIK, PRK, SMILE)** for long-term correction.

(b) Managing Other Health Conditions

Sowedí – High Blood Sugar (Hyperglycemia/Diabetes Risk)

Causes: Insulin resistance or insufficient insulin production.

Management Advice:

- **Diet:** Eat balanced meals with controlled carbohydrates (whole grains, vegetables, lean proteins). Avoid sugary drinks and processed foods.
- **Exercise:** At least 150 minutes of moderate activity weekly (walking, cycling, swimming).
- **Monitoring:** Regular blood sugar checks (before meals, after meals, bedtime).
- **Medical Care:** Follow doctor's advice on insulin or oral medications if prescribed.
- **Lifestyle:** Maintain healthy weight, manage stress, avoid smoking and excess alcohol.

John – High Blood Pressure (Hypertension)

Causes: Narrowing of blood vessels, excess salt intake, obesity, stress, genetic factors.

Management Advice:

- **Diet:** Reduce salt intake (<1500 mg/day), eat fruits, vegetables, whole grains, and lean proteins.
- **Exercise:** 30 minutes of aerobic activity most days (walking, jogging, swimming).
- **Weight Control:** Lose excess weight, especially around the waist.

- **Lifestyle:** Quit smoking, limit alcohol, manage stress, ensure 7–9 hours of sleep.
- **Medical Care:** Take prescribed antihypertensive medications consistently; monitor blood pressure at home.

Key Takeaways

- **Sowed:** Hyperopia → corrected with convex lenses; must manage high blood sugar through diet, exercise, and monitoring.
- **John:** Myopia → corrected with concave lenses; must manage high blood pressure through lifestyle changes and medication.
- **Both:** Regular medical check-ups are essential to prevent complications (eye damage, heart disease, kidney problems).

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Thank you

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