

ALLIANCE INTEGRATED SECONDARY SCHOOL

S3 END OF TERM TWO ASSESSMENT

BIOLOGY THEORY 2026

Duration 2hrs.

Instructions:

- ★ Attempt all items in section A and any one from section B
- ★ Attempt three items in all.
- ★ Be neat

ITEM 1

In the village of Kayunga located in Entebbe, local farmers predominantly cultivate bananas and cassava. However, the village recently faced a prolonged dry spell followed by strong winds which brought a significant amount of dust that settled on the leaves and stems of banana and cassava crops. The farmers are worried that if this problem persists, it could lead to severe losses in their harvests.

Task

(a) Identify the life processes affected in the plants (3 scores)

- Photosynthesis; Gaseous exchange; Transpiration; Respiration ✓

3+AI

(b) Explain

(i) How the functioning of these plants is affected (4scores)

- There was accumulation of dust onto the leaves, covering the surface and stomata reducing the surface area for trapping sunlight and absorption of Carbon dioxide respectively, hence reducing the rate of photosynthesis leading to poor yields. (Ue+2) ✓

(ii) Solutions that the farmers of Kayunga could implement to overcome the challenges posed by dust on their crops. (3scores)

- Regularly spray cassava plants with water to remove dust. ✓
- Use irrigation systems that minimize dust accumulation. ✓
- Plant windbreaks or use row covers to reduce dust settling on crops. ✓
- Mulch around plants to reduce dust stirring up from the soil. ✓
- Consider planting dust-tolerant crop varieties. ✓

3+AI

ITEM 2

Kennedy was formerly a young responsible man. Recently, he joined a drinking group that he is so much attached to; he drinks daily and heavily. His children are now out of school and look malnourished. One evening, when he was coming from his drinking joint, he fell down and broke his only pair of eyeglasses, which he had been using for a long time. Now, Kennedy struggles to read only at close range.

Task

(a) How has Kennedy's involvement in his group disorganized his family? (4 scores)

- Neglect of family responsibilities: He now spends much of his time drinking instead of caring for his family. ✓
- Loss of income: Heavy drinking likely reduces his ability to work well or manage money properly. ✓
- Children out of school: Because of poor financial support, his children have stopped attending school. ✓
- Poor nutrition: His children look malnourished, showing that the family is not getting enough food or proper care. ✓
- Family instability: His changed behavior has likely caused stress, conflict, and emotional suffering in the home. ✓
- Poor decision-making and accidents: His drinking led to a fall that broke his glasses, which further affects his ability to read and function normally. ✓ (U1+4)

(b) Explain why Kennedy is now struggling to read and how his eye glasses were helping him to read. (4 scores)

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(c) What should be done in society to overcome challenges related to those faced by Kennedy and his group? (2scores)

- Educate people about the dangers of alcohol abuse ✓
- Support education for children ✓
- Enforce laws on alcohol misuse ✓
- Strengthen family support ✓
- Create employment and income opportunities ✓
- Provide counseling and rehabilitation ✓ (A1+2)

SECTION B

Item 3

Teaching children how lungs function to ensure ventilation seems difficult. As a graduate of biology in gaseous exchange, design a model and demonstrate how it can be used to teach the mechanism of breathing in, to enable children understand it with locally available materials. Your design should include aspects like title, list of each material and the part it represents on the human respiratory system, Procedures, illustration of the model, explanation of how it works and conclusion. **(20 scores)**

Item 4

Mutesi is one of the famous athletes in Uganda who participated and represented the country in common wealth games in Russia. In one of the Olympics games before the competitions began. Mutesi took a meal rich in carbohydrates 30 minutes to the race. At the start of the race, she was observed splinting very fast but towards the end, her speed reduced, heart beat and breathing rate increased and had a lot of muscular pain in her legs.

After the race, she rested for 20 minutes and stopped and stood up to jubilate her success.

Task;

a) Describe how the carbohydrates were metabolized in her body to enable her to win the race. (8 scores)

- Digestion of carbohydrates: The carbohydrate meal was broken down in the digestive system into glucose, this glucose was absorbed into the bloodstream from the small intestine.
- Transport to the muscles: The blood carried glucose to the muscles that were working during the race.
- Respiration in the muscle cells: Inside the muscle cells, glucose was broken down during cellular respiration to release energy.
- Energy release: The energy released was used for: muscle contraction, movement of limbs and maintaining body activities during the race. The energy released enabled her muscles to work strongly and quickly at the beginning of the race. This gave her power and speed for running.

Equation for aerobic respiration

(Ue+4)

Glucose + Oxygen → Carbon dioxide + Water + Energy

b) Explain the challenges her body experienced towards the end of the race (6 scores)

- Oxygen shortage: As she ran faster, her muscles needed more oxygen than the body could supply. The breathing and heart rate increased to try to provide enough oxygen.
- Anaerobic respiration: Because oxygen supply became insufficient, the muscles started using anaerobic respiration for a short time.
- Lactic acid build-up: Anaerobic respiration produces lactic acid. The accumulation of lactic acid in the leg muscles caused: muscular pain, fatigue, reduced speed. Reduced performance: The muscles became tired, so her running speed reduced near the end of the race.

(Ae+3)

c) Explain how her body managed to overcome the challenges to enable her jubilation after the race.

After the race, she rested for 20 minutes. (6 scores)

- Rest: Rest reduced the demand for oxygen by the muscles.
- Deep breathing: Her breathing rate remained high to take in more oxygen. This helped repay the oxygen debt.
- Faster heartbeat: Her heart continued beating faster to transport oxygen to the muscles.
- Oxidation of lactic acid: The extra oxygen was used to break down lactic acid into harmless substances. This reduced muscle pain and restored normal body function.
- Recovery of energy stores: Her body also used some of the energy to rebuild normal muscle conditions and help her recover.

(U1, Ae+3,4)

END