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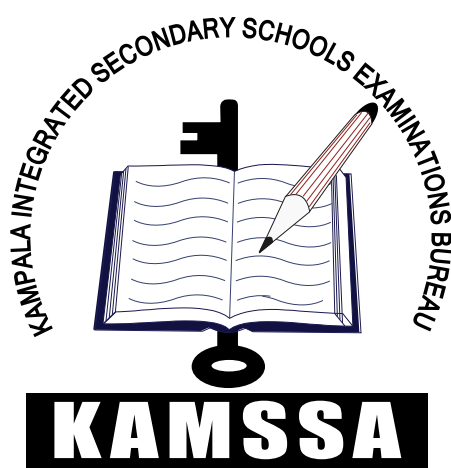
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BIOLOGY

Paper 1

July - August 2025

2½ hours



Index NO							

UCE & UACE

KAMSSA JOINT MOCK 2026

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KAMSSA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

BIOLOGY

Paper 1

2 hours 30 minutes

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.

SECTION A

ITEM 1

Musoke is a renowned maize farmer in Nakaseke district. His farm covers a large acreage and has been giving him good yields in every harvesting season for a long period of time. While upgrading the tarmac road alongside his farmland, a lot of dust was produced by the heavy machinery used during the process, which was blown by wind into his maize plants that were also at flowering stage. Most of the green maize plants turned brown with time. This greatly affected their productivity and poor yields were got during the harvesting season. Therefore, Musoke encountered a number of losses that season.

Learner's task

(a) Mention the major plant organs and processes that were greatly affected by the prevailing conditions.

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(b) Explain how the prevailing conditions affected the normal functioning of processes in the maize plants.

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(c) Explain how the maize plants in Musoke's farm were able to give out some yields despite the challenges encountered.

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ITEM 2

Mary's grandmother always complains about lower back pain, shortness of breath and due to old age, her posture changed and now days she walks with the aid of a walking stick. One of these days while preparing lunch in the kitchen, she accidentally lifted a hot saucepan from the charcoal stove and encountered a lot of pain. The saucepan later slipped away from her hands as she tried lifting it and all the soup poured on the kitchen floor and lower limbs. She encountered a number of burns on her lower limbs which are currently being nursed at the nearby health facility.

Learners' task

(a) Explain the series of events that took place in the grandmother's body from the moment she touched the hot saucepan till when she released it.

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This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

Joan, a senior four learner at Seku Senior Secondary School engaged in a serious relationship with Fred, her boyfriend. Before completing her studies, she became pregnant while at school. Her friends in the dormitory advised her carry out an abortion though she hesitated and thus dropped out of school. She did not attend antenatal care and therefore encountered a number of challenges during pregnancy. At birth, it was discovered that she gave birth to a baby with pink eyes and white skin. This greatly perturbed her and Fred because they had never heard about such a condition.

(a). Identify the genetic disorder encountered and explain why Joan was right not to take her friends' advice.

(b) Explain to Fred and Joan to understand the likely cause of the genetic disorder their newborn baby was suffering from.

Turnover

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

Attempt a total of **two** items from this section, taking **one** item from each part.

*Attempt only **one** item from this part. Answers should be written in the answer booklets provided.*

Mabira forest is one of Uganda's biggest forests with indigenous trees and plants of various species. In bid to expand sugar production, an Indian investor decided to hire part of its land from the government for sugarcane planting. He cleared trees to create land for sugarcane growing, applied artificial fertilizers rich in nitrates and phosphates into the waterlogged soils, used heavy machinery that produced fumes into the atmosphere and burnt some areas. This did not amuse local residents who sought for government intervention due to drastic environment changes that were encountered in their communities.

- Explain the effects of the various activities by the investor on the environment and living organisms in the forest.
- Explain why it was important for the local residents to seek government intervention.

ITEM 5

Before Namanve became an industrial area, there was Namanve forest reserve, a number of swamps with much papyrus, other swampy vegetation cover and a variety of species of organisms. In the bid to expand the country's economy and also improve on revenue collection, the president encouraged investors to upgrade the area by setting up more manufacturing industries in the area. Currently, there is a lot of flooding in the area when there are heavy downpours, increased malaria cases, little rainfall received in the area and respiratory associated diseases amongst the residents.

Learner's task

- (a) Explain the challenges encountered by the residents and why it was important for the government to conserve such an area?
- (b) Explain what could be done by the local residents to overcome the likely challenges encountered in the area.

PART II

*Attempt only **one** item from this part. Answers should be written in the answer booklets provided.*

ITEM 6

Kasango is a businessman in Masaka town who spends his leisure time drinking alcohol and smoking cigarettes with his peers. He oftenly feeds on fatty meat and prefers eating foods with a lot of sugars from a local restaurant and thus added a lot of body weight. His doctor advised him to engage in regular physical exercises in order to keep him physically fit and to prevent him from suffering from some health-related problems. However, during his first visit to the gym, he experienced heavy breathing, increased heart rate, painful muscle cramps and sweated a lot.

Learner's task

- (a) Explain the possible causes of Kasango's experience while exercising.
- (b) Apart from engaging in physical exercise, how can you advise him to manage his lifestyle?

ITEM 7

While watching last year's Olympic games on the television set, Cheptegei who represented Uganda in the games won the race and was awarded a medal. However, before the competitions began, he was given glucose powder by his coach as an energy booster. During the race, his heartbeat and sweating rate increased. He was also seen breathing deeply as he ran around the pitch with a lot of fatigue. Finally, he won the race and all these disappeared and was able to move to receive his medal and also celebrate his victory.

Learner's task

- (a) Explain the challenges experienced by Cheptegei during the race.
- (b) How Cheptegei was able to move to receive his medal, and how his body returned to a normal state after the race.

KAMSSA UCE BIOLOGY PAPER 1
SCORING GUIDE 2025
SECTION A

ITEM 1

Musoke is a renowned maize farmer in Nakaseke district. His farm covers a large acreage and has been giving him good yields in every harvesting season for a long period of time. While upgrading the tarmac road alongside his farmland, a lot of dust was produced by the heavy machinery used during the process, which was blown by wind into his maize plants that were also at flowering stage. Most of the green maize plants turned brown with time. This greatly affected their productivity and poor yields were got during the harvesting season. Therefore, Musoke encountered a number of losses that season.

Learner's task

(a) Mention the major plant organs and processes that were greatly affected by the prevailing conditions.

Plant organs and processes affected

Plant organs Process affected

Flowers Fertilization, Pollination, reproduction

Stem Gaseous Exchange

Leaves Photosynthesis, gaseous exchange, transpiration.

(b) Explain how the prevailing conditions affected the normal functioning of processes in the maize plants.

Flower, petals become dull colored by the dust and thus uneasily seen by insect pollinators e.g. the bees thus no pollination, fertilization occurred.

Leaves become brown, which reduced the amount of chlorophyll present; therefore little amounts of sunlight energy were trapped thus a decrease in the amount of food formed/ photosynthesis.

Stomata on the leaves were blocked by the dust, which prevented entry of carbon dioxide, a raw material for photosynthesis / reduced surface area available for entry of gases thus decrease in photosynthesis.

Stomata on the leaves were blocked by the dust which reduced the surface area available for water loss thus minimal / no transpiration occurred causing the plants to store a lot of water.

4+Ue-04

3Ue-03

1-2Ue-02

UI-01

(c) Explain how the maize plants in Musoke's farm were able to give out some yields despite the challenges encountered.

Some lower maize leaves remained green and thus plants were able to trap some sunlight which was used during photosynthesis.

Most of the stomata on the lower surfaces were unblocked which permitted entry of carbon dioxide, a raw material for photosynthesis.

Phloem tissue in the stems were unaffected there was continuous supply/transport of water and mineral salts required for photosynthesis.

Some pollen grains were carried into the flower stigma by wind which enhanced pollination/fertilization.

4+Ae-04

3Ae-03

ITEM 2

Mary's grandmother always complains about lower back pain, shortness of breath and due to old age, her posture changed and now days she walks with the aid of a walking stick. One of these days while preparing lunch in the kitchen, she accidentally lifted a hot saucepan from the charcoal stove and encountered a lot of pain. The saucepan later slipped away from her hands as she tried lifting it and all the soup poured on the kitchen floor and lower limbs. She encountered a number of burns on her lower limbs which are currently being nursed at the nearby health facility.

Learners' task

(a) Explain the series of events that took place in the grandmother's body from the moment she touched the hot saucepan till when she released it.

Heart stimulated thermo-receptors/sensory cells of the skin which generated impulses; and formed them to the spinal cord via the sensory neurones. In the spinal cord, impulses from the sensory neurones pass via a synapse to the relay neurone; then via another synapse to motor neurone which carry the impulses to the muscles of the arm, causing them to contract to release the hot pan.

(b) Explain the likely causes of the grandmother's healthy conditions.

The grand mother is suffering from osteoporosis

- changed posture due to bent bones making her unable to stand upright.
- Lower back pain due to minor dislocation at the joint.
- shortness of breath due to loss of elasticity of the lung tissue make them incapable of expanding.
- Weak bones due to less calcium content, leading to poor bone formation.

8+Ue-04

5-7Ue-03

1-4Ue-02

UI-01

(c) Advise Mary's grandmother on how she can manage and improve her health conditions.

- Increasing intake of foods containing calcium and phosphorous to strengthen the bones.
- Increasing the intake of foods rich in vitamin D which is important for absorption of calcium then gut.
- Physical exercise to increase strength of the bones by increasing it calcification and blood flow into the bones.
- Injection of oestrogen hormones which maintain bone density in the females.

4+Ae-04

3Ae-03

1-2Ae-02

AI-01

ITEM 3

Joan, a senior four learner at Seku Senior Secondary School engaged in a serious relationship with Fred, her boyfriend. Before completing her studies, she became pregnant while at school. Her friends in the dormitory advised her carry out an abortion though she hesitated and thus dropped out of school. She did not attend antenatal care and therefore encountered a number of challenges during pregnancy. At birth, it was discovered that she gave birth to a baby with

pink eyes and white skin. This greatly perturbed her and Fred because they had never heard about such a condition.

Learner's task

(a). Identify the genetic disorder encountered and explain why Joan was right not to take her friends' advice.

The genetic disease is Albinism due to lack of the protein that codes for the production of melanin causing white skin and pink eyes.

- She was right because abortion is unlawful and therefore can result into being arrested.
- Abortion can result into death as a result of excessive bleeding.
- Abortion can result into reproduction disorders like fistula due to small pelvic girdle.
- It results into permanent infertility since the uterus can be damaged resulting into its permanent removal.

(b) Explain to Fred and Joan to understand the likely cause of the genetic disorder their newborn baby was suffering from.

Both Fred and Joan are carriers for Albinism

Let A represent an allele for at normal skin color

Let a represent an allele for abnormal skin color

Parental phenotype

Carrier woman

X

Carrier man

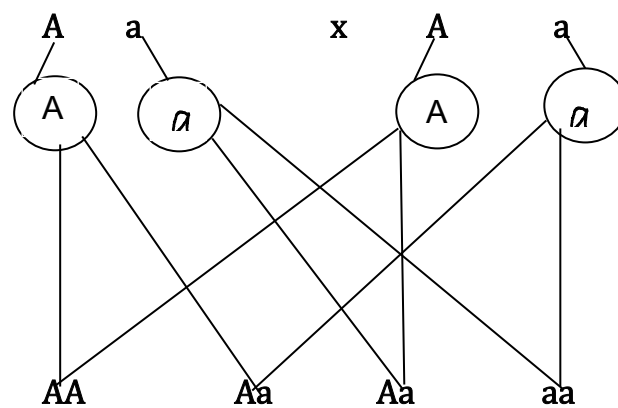
Parental genotype

Meiosis

Gametes

Random fertilization

F1 offspring genotype



F1 offspring phenotype 1 normal skinned, 2 carriers and 1 albino

Since there is a probability of producing an albino, the baby produced was a result of that

10+Ue-06

8-9Ue-05

6-7Ue-04

3-5Ue-03

1-2Ue-02

U1 -01

(c) What should parents do for their children to prevent them from encountering a situation similar to that of Joan while still at school?

- Provide guidance and counselling on the dangers of early pregnancy.
- Establish activities that engage their daughters like sports debate to keep them busy.
- Ensure their daughters dress decently to avoid using men into having sex with them.
- Strict laws to prevent pre-marital sex
- Provide personal needs to the daughter not lured into sex for cash.

4+Ae-04

3Ae-03

1-2Ae-02

A1-01

SECTION B

*Attempt a total of **two** items from this section, taking **one** item from each part.*

PART I

*Attempt only **one** item from this part. Answers should be written in the answer booklets provided.*

ITEM 4

Mabira forest is one of Uganda's biggest forests with indigenous trees and plants of various species. In bid to expand sugar production, an Indian investor decided to hire part of its land from the government for sugarcane planting. He cleared trees to create land for sugarcane growing, applied artificial fertilizers rich in nitrates and phosphates into the waterlogged soils, used heavy machinery that produced fumes into the atmosphere and burnt some areas.

This did not amuse local residents who sought for government intervention due to drastic environment changes that were encountered in their communities.

Learner's task.

(a) Explain the effects of the various activities by the investor on the environment and living organisms in the forest.

- Deforestation as a result of clearing trees to create land for sugarcane growing which leaves the soil bare exposing it to the agents of soil erosion.
- Soil degradation as a result of applying artificial fertilizers into the water logged soils which resulted into lowering of PH hence death of soil living organisms.
- Water pollution as a result of applying artificial fertilizers rich in nitrates and phosphates that cause eutrophication which leads to death of aquatic organisms.
- Air pollution as a result of using heavy machinery that produced fumes into the atmosphere which resulted into respiratory diseases to humans e.g. lung cancer.

Bush burning as a result of burning some areas which resulted into death of soil living organisms e.g. earthworm.

4+Ue-04

3Ue-03

1-2Ue-02

Ul-01

(b) Explain why it was important for the local residents to seek government intervention.

- Conservation of forests helps in reducing soil erosion since trees act as wind breakers.
- Conservation of forests provides humans with herbal medicine that treats different diseases.
- Forests are sources of food to organisms like monkeys that feed on the leaves of trees and fruits.
- Forests are habitats to wild animals.
- Forests help in rain formation that helps in proper plant growth.
- Forests help in the filtering of air by absorbing carbon dioxide which prevents global warming.

6+Ue-06

5Ue-05

4Ue-04

3Ue-03

1-2Ue-02

Ul -01

ITEM 5

Before Namanve became an industrial area, there was Namanve forest reserve, a number of swamps with much papyrus, other swampy vegetation cover and a variety of species of organisms. In the bid to expand the country's economy and also improve on revenue collection, the president encouraged investors to upgrade the area by setting up more manufacturing industries in the area. Currently, there is a lot of flooding in the area when there are heavy downpours, increased malaria cases, little rainfall received in the area and respiratory associated diseases amongst the residents.

Learner's task

(a) Explain the challenges encountered by the residents and why it was important for the government to conserve such an area?

Challenges encountered by residents.

- Deforestation as a result of clearing Namanve forest reserve to establish the industries. Which reduced the number of trees that help in rainfall formation hence little rainfall received.
- Swamp reclamation resulted into flooding in the area since swamps are water catchment areas and so when destroyed water gazettes within the areas hence flooding.
- The drainage of swamps resulted into increased malaria causes as a result of stagnant water that collects within areas previously occupied by swamps.
- Air pollution as a result of fumes produced by industries into atmosphere result into respiratory diseases among the residents since gases like sulphur dioxide that is emitted cause blackening of the lungs.

4+Ue-04

3Ue-03

1-2Ue-02

UI-01

Benefits of conservation

- Swamps are habitats to aquatic organisms.
- Swamps are sources of fish to humans which are sources of proteins.
- Swamps are sources of raw materials like papyrus that are used for making baskets.
- Swamps help in rain formation since they have thick vegetation which help in proper plant growth.

b) Explain what could be done by the local residents to overcome the likely challenges encountered in the area.

- Use of air filters in industries that absorb toxic fumes which reduces respiratory associated diseases.
- Replanting trees which play a big role in rainfall formation which increases the amount of rain received.
- Digging drainage channels which drain away heavy rains/flooded waters to prevent flooding.
- Pouring oil on the stagnant water to prevent the breeding of mosquitoes that reduce malaria cases.

10+Ue-06

8-9Ue-05

6-7Ue-04

3-5Ue-03

1-2Ue-02

UI -01

PART II

Attempt only one item from this part. Answers should be written in the answer booklets provided.

ITEM 6

Kasango is a businessman in Masaka town who spends his leisure time drinking alcohol and smoking cigarettes with his peers. He oftenly feeds on fatty meat and prefers eating foods with a lot of sugars from a local restaurant and thus added a lot of body weight. His doctor advised him to engage in regular physical exercises in order to keep him physically fit and to prevent him from suffering from some health-related problems. However, during his first visit to the gym, he experienced heavy breathing, increased heart rate, painful muscle cramps and sweated a lot.

Learner's task

(a) Explain the possible causes of Kasango's experience while exercising.

Kasango experienced the following

- Heavy breathing due to the need to expel off the high volumes of carbon dioxide produced during respiration and also take in more oxygen required for respiration.
- Increased heart rate in order to supply blood rich in oxygen to respiring tissues and also quickly transport blood with carbon dioxide to the lungs to be expelled.
- Painful muscle cramps due to accumulated Lactate in the muscles as a result of anaerobic respiration recurring.
- A lot of sweating due to tissue respiration occurring producing a lot of metabolic water lost from the body in form of sweat.

4+Ue-04

3Ue-03

1-2Ue-02

UI-01

(b) Apart from engaging in physical exercise, how can you advise him to manage his lifestyle?

- Kasango should engage in health clubs, good peer groups that keep him busy and active to avoid loneliness, boredom which drives him to drinking and smoking.
- Kasango should always feed on a balanced diet in order to supply his body with nutrients in their right proportions to avoid dietary related diseases.
- Kasango should seek guidance and counselling from trained counsellors to know about the health effects associated with drinking and smoking and possible ways of overcoming them.
- In case of health related diseases due to smoking e.g. Lung cancer, bronchitis, Kasango should seek medical attention from health workers in order to overcome the diseases.

4+Ae-04

3Ae-03

1-2Ae-02

AI-01

ITEM 7

While watching last year's Olympic games on the television set, Cheptegei who represented Uganda in the games won the race and was awarded a medal. However, before the competitions began, he was given glucose powder by his coach as an energy booster. During the race, his heartbeat and sweating rate increased. He was also seen breathing deeply as he ran around the pitch with a lot of fatigue. Finally, he won the race and all these disappeared and was able to move to receive his medal and also celebrate his victory.

Learner's task

(a) Explain the challenges experienced by Cheptegei during the race.

Cheptegei encountered the following challenges:-

- Respiring tissues run short of blood with oxygen for tissue respiration/energy production and also blood contained a lot of carbon dioxide to the lungs to be expelled off leading to increased heart rate.
- There was excess heat produced due to a lot of aerobic /tissue respiration occurring in his body producing a lot of water that was lost in form of sweat leading to increased sweating.
- Respiring tissues run short of oxygen for tissue / aerobic respiration and also quickly expel off there was excess carbon dioxide produced during tissue respiration to prevent tissue poisoning leading to deep breaths.
- Accumulated lactate in the muscles as a result of muscles respiring anaerobically during the oxygen debt led to muscle fatigue.

4+Ue-04

3Ue-03

1-2Ue-02

UI-01

(b) Why Cheptegei was able to move to receive his medal, and how his body returned to a normal state after the race.

- Due to occurrence of an oxygen debt, some anaerobic respiration occurred producing carbon dioxide and some energy in form of ATP that was used in muscle contraction to bring about movement.
- Cheptegei took in deep breaths and therefore his body was availed more oxygen for tissue respiration thus producing more energy.
- At the same time, the deep breaths enabled Cheptegei expel off excess carbon dioxide produced during tissue respiration thus preventing tissue poisoning leading to effective functioning of body processes.
- The accumulated lactate in the muscles was transported to the liver where it was oxidized thus producing more energy in form of ATP for contraction of muscles.
- Occurrence of sweating led to cooling of the body since some heat was lost from the body in form of sweat.

4+Ae-04

3Ae-03

1-2Ae-02

AI-01