

Candidate's Name.....

Index Number: Signature:

553/1

Biology

Paper 1

July/August 2024

2 Hours



**RWENZORI REGION SESEMAT AND ASSHU
(RRSA) MOCK EXAMINATIONS**

UGANDA LOWER SECONDARY CERTIFICATE OF EDUCATION

BIOLOGY

Paper 1

Theory

2 Hours

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.

Item 1

Maize is a cash crop that significantly benefits both our economy and food security. A study was carried out to determine the effect of amount of rainfall received by an area on maize productivity in Rwimi. Rwimi is an area whose soils are sufficiently fertile for maize farming and during the study time, the amount of sunshine received in this area was enough for proper maize growth. The following data was obtained.

Amount of rainfall received (mm/hr)	0.3	0.4	0.60	1.00	1.240	3.80	5.00	7.20	7.60	10.0	12.0
Maize productivity (kg/ha)	60.4	74.25	821	821.8	899.6	1600	1810.7	1800	1710	1542	823

NB

- Rainfall less than 0.5mm/hr is very little.
- Rainfall greater than 0.5mm/hr but less than 4.0mm/hr is moderate.
- Rainfall greater than 4.0mm/hr but less than 8mm/hr is heavy.
- Rainfall greater than 8mm/hr is very heavy.

Task

- a. Identify the processes which are highly affected in the maize plants when the amount of rainfall received was between 0.4mm/hr and 0.3mm/hr that made the productivity to be low.

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- b. Explain why maize productivity was high when the amount of rainfall received was between 3.80mm/hr and 7.20mm/hr.

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- c. Suggest and explain what lead to reduction in productivity of maize when rainfall increased beyond 8mm/hr.

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Item 2

Wayaki, a 30-year-old marathon runner, is participating in desert marathon. The race takes place in extremely hot and dry conditions (35°C, 10% humidity). Wayaki has been training for months, but He's concerned about the risk of dehydration, accumulation of too much heat in the body and muscle cramps that may occur during the marathon.

Task

a) Why is it necessary for Wayaki to first undertake a training?

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b) How will Wayaki's body coordinate osmoregulation and locomotion to maintain proper body functions during the marathon?

(i) Osmoregulation

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(ii) Locomotion

Item 3

A couple with normal skin colour has a three-year-old child who was born with a rare genetic disorder called albinism. The woman is one month pregnant for the next child, the couple has not yet gone for antenatal care and the couple is concerned about the risk of passing on the disorder to their next child.

Task

- a) Using appropriate genetic symbols, explain to the couple the chances of their next child inheriting the disorder.

b) Explain why you would advise the above couple to start going for antenatal care?

c) What are the complications a child with the above disorder is expected to experience as he/she grows as a result of his/her condition?

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SECTION B

PART 1

Answer only one item from this part. Answers should be written in the answer booklet/sheet(s) provided.

Item 4

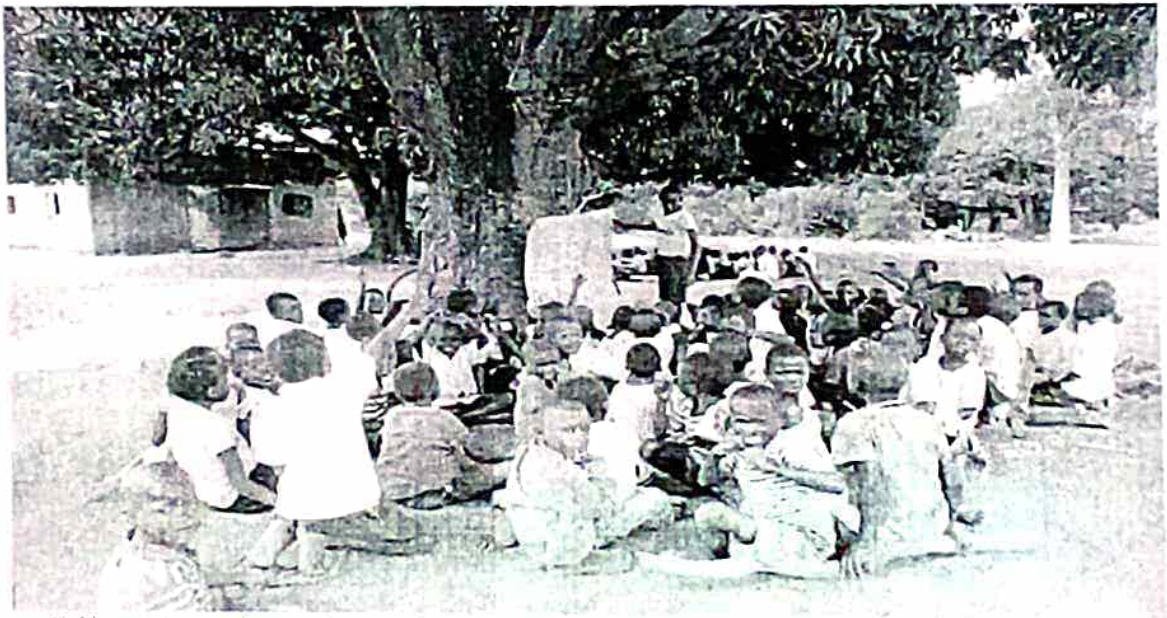
Uganda traditionally known for its lush green landscapes during the rainy season, finds itself under the unexpected grip of scorching heatwaves.

Despite the anticipation of rain, many regions across the country were experiencing unusually high temperatures with 29°C as of 14th/03/2024 leaving authorities and residents puzzled.

In regions such as Kampala, Masaka and Jinja, temperatures raised above the seasonal average temperature with areas daytime temperature as high as 35°C .

(Extracted from Nilepost news 14th/03/2024 by: Adam Mayambala)

Because of this situation some people sought for shelter under trees during afternoon hours to avoid extreme heat.



Children studying under a tree in Soroti during the afternoon due to too much heat in classrooms.

Task

Explain how various human related factors are responsible for causing the above condition, other negative impacts it has on earth and suggest the possible mitigation measures for the condition.

Item 5

Malaria is the leading cause of sickness and death in Uganda and is responsible for up to 40% of all outpatient visits, 25% of hospital admissions and 14% of all hospital deaths but the good news is that it is preventable. According to minister of state for health in charge general duties, Hon. Anifa Kawooya, world malaria day is an opportunity for all leaders, policymakers and general public to raise awareness about the still-existing dangers of malaria and the need for appropriate approaches to mitigate this killer disease. "malaria remains a significant public health challenge in Uganda, but through collaborative efforts and innovative strategies, we are making progress in our fight against the disease, on this world wide malaria day, we renew our commitment to achieving a malaria-free Uganda and call upon all stakeholders to join us in this critical endeavor" she said.

Task

As one of the stakeholders, explain the vector-related and parasite-related factors that make it is so difficult eradicate the above disease especially in countries which lie in the tropics. Also identify the biological control method used to control the disease and explain its advantages.

Part II

Answer only one item from this part. Answers should be written in the answer booklet/sheet(s) provided.

Item 6

Mr. Chegge, a 75-year old retired man has been eating a diet consisting mainly of protein-rich foods such as meat, fish, eggs and legumes for the past year. He consumes very little carbohydrates or fibers. His daughter, a nutritionist is concerned about the impact of his father's diet on his health.

Task

Explain to Mr. Chegge the process through which the food he mostly eats passes through to enter the blood stream, how soluble absorbed products are dealt with in the body and the complications he's likely to develop if he doesn't adjust his diet.

Item 7

During covid-19 pandemic in 2020, the president of Uganda passed an order for everyone to put on a nose mask when one is out of his/her home. Jim was jogging on northern bypass in Kampala with his nose mask on. He got complications in breathing and he had to put off the mask. When Jim put off the mask, he was able to jog without any complications.

Task

Identify and explain the complications Jim faced and examine further risks that would have occurred in his body if he had continued running with a mask.

END