

Name.....Signature: .....

School .....

**553/1**  
**BIOLOGY**  
**(Theory)**  
**June/July**  
**2024**  
**2 ½ hours**



## **MEPSA RESOURCEFUL ASSESSMENT 2024**

**Uganda certificate of education**

**BIOLOGY**

**Paper 1**

**Theory**

**2 hours 30minutes**

### **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.*

**Turn Over**

## SECTION A

*Answer **all** items in this section in the spaces provided.*

### **Item 1.**

Mr. Mukasa is a large-scale bean farmer who supplies his local market. During one growing season, his bean plants were struck by a disease just as the bean pods were forming. Concerned about potential poor yields and the risk of not meeting market demand, Mukasa sought advice.



**Fig. 1** shows the appearance of some of Mr. Mukasa's bean plants after being attacked by the disease.

### **Task:**

As a biology student,

- (a) Identify the pests that might have affected James' bean plants and list common diseases that attack bean plants.

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(b) Explain the impact of the disease on the biological processes within the bean plants.

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(c) Propose solutions to help James and other farmers prevent and manage similar challenges in the future.

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## Item 2

Peter, a teenager, recently joined a peer group of boys who smoke, use marijuana, and frequently watch films at the cinema hall in trading centers late into the night. As a result, he has adopted these behaviors. One night at midnight, while returning home from watching a film, Peter encountered a dog that barked loudly at him. This caused his heart rate, breathing rate, and mental alertness to increase significantly. In response, he ran away quickly and avoided being bitten by the dog.



**Fig. 2** Shows Peter smoking and some of his peer group friends.

Task:

- (a) Describe how Peter's body coordinated his response to the barking dog, including the physiological reactions that occurred.

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(b) Discuss the potential effects of Peter's current lifestyle on his health and well-being.

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(c) Suggest ways Peter can change his lifestyle for the better.

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**Item 3.**

Mary, a 17-year-old girl, became pregnant by a man from her home village. After the birth of their baby, the man refused to provide any parental support, claiming that the baby's appearance was unlike anyone in his family lineage. Distressed, Mary consulted a doctor who explained that the baby's unusual appearance was due to a genetic disease.



**Fig. 3** shows the appearance of Mary's baby held at her back.

**Task:**

As a biology student,

- (a) Identify the genetic disease the baby might have and explain how it is possible for the man to be the father despite his claims.

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(b) Discuss the challenges Mary is likely to face in this situation.

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(c) Suggest ways teenagers can avoid early pregnancy.

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## SECTION B

### Part 1

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

In the regions surrounding Lake Victoria, residents have engaged in activities such as sand mining, constructing structures, and poor waste management. These practices have led to several environmental challenges, threatening the sustainability of the lake.

**Task:**

Explain to the residents how these environmental challenges have arisen. Additionally, provide advice on how to address these challenges and emphasize the importance of natural resources in the area.

#### **Item 5.**

In Sembabule District, there is significant environmental degradation due to extensive tree cutting for charcoal burning and the depletion of swamps for agricultural settlements. The district environmental officer has organized a conference for residents titled "Conservation of Natural Resources."



**Fig. 4(a)**



**Fig. 4(b)**

**Task:**

As an environmentalist, explain the environmental challenges that need to be addressed to the residents and propose solutions. Suggest measures to emphasize the importance of environmental conservation.



## Part II

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

### Item 6

Musa and Hakim are local brick makers. One day, Musa drank a lot of sugar cane juice and claimed it would help him make more bricks per day. Hakim didn't understand how this was possible. While making bricks, Musa experienced some physical challenges but returned to his normal state afterward.

#### Task:

As a biology student, explain to Hakim how the sugar cane juice affected Musa's body to help him make more bricks, the challenges Musa experienced, and how his body was able to return to its normal state.

### Item 7

A smoker and a non-smoker participated in a 100-meter race. During the race, the smoker developed muscle pain and collapsed before finishing, while the nonsmoker completed the race without any issues, experiencing only normal bodily changes. Their oxygen absorption rates from the lungs were 20% and 70%, respectively. Eventually, the smoker recovered from the muscle pain.

Table 1 shows the percentage of oxygen absorbed from the lungs of each individual during breathing.

Individual	Percentage of oxygen absorbed
Smoker	20
Non smoker	70

#### Task:

Using biological knowledge of a physiologist, explain to the smoker and nonsmoker the experiences their bodies went through during the race and how the smoker recovered from muscle pain.

Advise the smoker on how to manage and prevent the challenges experienced during the race.

**END**