

NAME:.....

SIGNATURE:..... STUDENT NUMBER.....

553/2

**BIOLOGY PAPER 2**

(PRACTICAL)

FEB/MARCH 2024

2 HOURS

**UGANDA CERTIFICATE OF LOWER SECONDARY EDUCATION  
COMPETENCE BASED ASSESMENT**

**SENIOR FOUR**

**BIOLOGY PRACTICAL**

**TIME: 1 ½ hours**

***Instructions to candidates:***

- *This paper consists of one item*
- *Answers should be written in the spaces provided*
- *Your work should be clearly presented and tidy. Dirty work will lead to loss of marks*
- *Your answers should be precise and concise*

***FOR EXAMINERS' USE ONLY***

ITEM	TOTAL MARKS	ACTUAL MARKS
1	45	

## ITEM ONE

Mariam, a three-year-old girl, is always sickly, failed to gain any weight and is always tired and crying. During her 6-monthly visit to the hospital, the doctor wanted to know the food she has been feeding on, and a sample was brought to him. He labeled it **P**. He recommended a different food material for Mariam for the next months and gave her month the sample labeled **Q**.

During their next visit to the hospital, Mariam's health had greatly improved and she had gained at least 5kgs of weight.

Task: you are provided with samples of food solutions **P** and **Q**. You are required to investigate the nature of these food substances to determine why solution **Q** was able to promote Mariam's recovery and explain why this food combination is good for growing children

Your response should include the following

- Aim of the experiment
- Hypothesis
- Risks and precautions
- Materials and apparatus used
- Procedure
- Presentation of results
- Conclusion

[illegible]

[illegible]

Advance information.

Solution P is 2% starch solution (made by dissolving 2 grams of starch in 100cm<sup>3</sup> of water, heat to 70°C, cool and filter.)

Solution Q is made by mixing the following solutions in a ratio of 1:1:1

- 2% starch solution (prepared as above)
- 1% egg white solution (made by dissolving 1cm<sup>3</sup> of egg white in 100cm<sup>3</sup> of water, heat to 70°C, cool and filter)
- Fresh, undiluted juice from ripe orange

Food test reagents provided.

- Iodine solution
- Benedict's reagent
- DCPIP
- NaOH
- HCl only.

Marking scheme.

**Aim:** *to determine the food substances present in samples P and Q (2 scores)*

**Hypothesis:** *food sample Q contains carbohydrates like starch, reducing sugars and non-reducing sugars, proteins and vitamin C. solution P lacks some nutrients essential for proper growth (3 scores)*

**Risks** (and correct one with appropriate precaution earns 2 scores)

*Burns during heating of substances.*

### Precautions

*Wear proper personal protective equipment*

*Don't handle hot substances with bare hands*

**Apparatus and materials.** (3 scores)

*Test tubes, boiling tubes, iodine solution, Benedict's solution, DCPIP solution, Sodium hydroxide, Hydrochloric acid.*

Tests (2 scores @)	Observations (1 score @)	Conclusion (1 score @)
To 1cm <sup>3</sup> of food sample in a test tube was added 2 drops of Iodine solution	<b>P.</b> the turbid solution turned black	Much starch present
	<b>Q.</b> the turbid solution turned black/blue	Much/moderate starch is present
To 1cm <sup>3</sup> of food sample in a boiling tube was added 1cm <sup>3</sup> of benedict's solution and boiled for 1 minute	<b>P.</b> the turbid solution turned pale blue	Reducing sugars are absent
	<b>Q.</b> the turbid solution turned to pale blue, to green, to yellow, to orange ppt	Much reducing sugars present. (Allow moderate)
To 1cm <sup>3</sup> of food sample in a boiling tube was added 1cm <sup>3</sup> of HCl, boiled and cooled followed by 1cm <sup>3</sup> of NaOH and 1cm <sup>3</sup> benedict's solution and boiled for 2 minutes.	<b>P.</b> the turbid solution turned to pale blue, to green, to a yellow ppt	Moderate non-reducing sugars present
	<b>Q.</b> The turbid solution turned to pale blue, to green, to yellow, to orange ppt	Much reducing sugars present. (Allow moderate)
To 1cm <sup>3</sup> of food sample in a test tube was added	<b>P.</b> turbid solution turned pale blue	Proteins absent

1cm <sup>3</sup> of NaOH and 5 drops of copper (ii) sulphate solution	Q. the turbid solution turned purple	Much proteins present
To 1 cm <sup>3</sup> of DCPIP in a test-tube was added the food solution dropwise until in excess	P. blue colour persisted	Vitamin C absent.
	Q. Blue solution turned colorless with addition of (5-8) drops	Much vitamin C present

Total =30 scores

Note: Allow non-tabular representation of data

Conclusion. Food sample Q contains food nutrients like starch, reducing sugars, non-reducing sugars, proteins and vitamin C while food sample P contains only starch and non-reducing sugars. (2 scores)

Explanation: food sample P lacks nutrients such as proteins and vitamin C which are essential for growth. Food sample Q provided essential nutrients for proper growth. (3 scores)