

**THE UNITED REPUBLIC OF TANZANIA**  
**NATIONAL EXAMINATIONS COUNCIL OF TANZANIA**  
**ADVANCED CERTIFICATE OF SECONDARY EDUCATION**  
**EXAMINATION**

**155/3**

**FOOD AND NUTRITION 3**

(For Both School and Private candidates)

**Time: 3 Hours**

**Year: 2022**

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**Instructions**

1. This paper consists of **three (3)** questions.
2. Answer **all** questions.
3. Question **one (1)** carries **twenty (20)**, and question **two (2)** and **three (3)** carry **fifteen (15)** marks each.
4. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet (s).

1. You are provided with a slice of white bread and a piece of beef. Perform the experiment I and II by following the given procedures.

**In Experiment I,** Place the slice of bread on a hot pan and heat each side at high temperature (above  $70^{\circ}\text{C}$ ) for 3 to 5 minutes. Record the observations on the changes in colour, texture and aroma.

**Questions:**

- (a) name and define the reaction which led to the observed characteristics,
- (b) briefly explain three steps involved in the reaction to obtain the observed characteristics
- (c) provide two roles of high temperature in this reaction.
- (d) outline two methods of cooking food which can result into the characteristic observed in the experiment I above.

**In Experiment II,** wash the piece of beef provided and directly place it on a hot pan. Heat each side at high temperature above ( $70^{\circ}\text{C}$ ) for 5 minutes. Record the observations on the changes in texture and aroma.

**Questions:**

- (a) Provide reasons for the changes in texture and aroma observed which differ in Experiment I and II.
- (b) Show how the texture of the beef sample observed in Experiment II is improved during processing.

2. You provided with table sugar, glucose, baking soda and yeast. Perform two experiments by following the procedures given under each experiment.

**Experiment I:** (a) Dissolve 10g of table sugar in 50ml of tap water in a flask and add 5g of yeast. Repeat procedure (a) by using glucose. Fill two gas jars with tap water and place each upsidedown supported by a beehive shelf in a trough/basin of water. Warm the flask

to 30°C. Immediately fit each flask with one end of delivery tube (using a tight fitting rubber stopper) and insert the other end into the beehive shelf in a trough/basin of water. Observe the changes that take place after two intervals of 15 minutes.

**Questions:**

- (a) write balanced equations for the observed reactions,
- (b) write roles played by sugar/glucose and yeast in the reactions and
- (c) give the property of yeast observed in this experiment.

**Experiment II:** Mix 2g of baking soda with 3ml of tap water in a clean and dry test tube. Fit the test tube with one end of delivery tube using a tight fitting rubber stopper and then deep the other end in a solution of lime water placed in another test tube. Gently heat the mixture while observing.

**Questions:**

- (a) Explain briefly the reaction which took place when heat was applied to the test tube containing baking soda,
- (b) write a balanced equation for the reaction explained in part (a) and
- (c) to write the importance of this reaction in baking.

3. You are provided with the samples **A**, **B**, **C** and **D**. Perform the Experiment **I** to **IV**. Record the observations and provide inferences of what you have observed and answer the question that follow.

**Experiment I:** In a test tube containing 2ml of sample **A** add 3 drops of dilute hydrochloric acid. Boil the mixture under low heat for a minute and allow it to cool. Add 3 drops of dilute sodium hydroxide solution followed by equal volume of Benedict's solution. Shake and boil the mixture again.

**Question:** Explain the bases of the observed changes, by providing two points.

**Experiment II:** In a test tube containing 2 ml of sample **B** add equal volume of dilute sodium hydroxide solution and mix thoroughly. Add 2 to 3 drops of 1% copper (II) sulphate solution and mix the mixture thoroughly.

**Question:** Provide the basis of the observed changes.

**Experiment III:** In a test tube containing 2g of sample **C** add 5ml of dilute hydrochloric acid and mix thoroughly. Filter the mixture and then neutralize the filtrate by adding ammonium hydroxide solution (Note: neutral filtrate will turn red litmus paper purple). Add equal volume of 5% ammonium oxalate solution to a portion of filtrate.

**Question:** Provide reason why dilute hydrochloric acid was added to sample **C**, and give a balanced equation for the reaction.

**In Experiment IV:** Dissolve 1g of sample **D** in concentrated nitric acid in a test tube. Filter the mixture and then add a few drops of 10% ammonium molybdate solution to a portion of the filtrate. Warm the mixture.

**Question:** Give two plant foods which are the best sources of the inference they have provided and reasons for warming the mixture.