THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

155/3 **FOOD AND HUMAN NUTRITION 3**

(For Both School and Private Candidates)

Time : 3 Hours **Year: 2008**

Instructions

1. This paper consists of sections **three (3)** questions.
2. Answer all questions.
3. Question **one (1)** carries **twenty (20)** marks and question **two (2)** and **three (3)** carries **fifteen (15)** marks each.
4. Communication devices and any unauthorised 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 yam and a piece of fish. Perform the experiment I and II by following the given procedures.

Experiment I: Place the slice of yam on a hot pan and heat each side at high temperature (above 70° C) for 3–5 minutes. Record changes in colour, texture, and aroma.

Questions:

(a) Name and define the reaction responsible for the observed characteristics.

(b) Briefly describe three steps involved in the reaction to obtain the observed characteristics.

(c) Provide two roles of high temperature in this reaction.

(d) Suggest two other cooking methods that produce similar results in yam.

Experiment II: Wash the piece of fish and place it directly on a hot pan. Heat each side at high temperature (above 70° C) for 5 minutes. Record changes in texture and aroma.

Questions:

(a) Provide reasons for the observed differences in texture and aroma compared to Experiment I.

(b) Explain one way to improve the texture of the fish during processing.

2. You are provided with maltose, sucrose, baking soda, and brewer's yeast. Perform the following experiments:

Experiment I: Dissolve 10 g of maltose in 50 ml of warm water and add 5 g of yeast. Repeat using sucrose instead of maltose. Fill two gas jars with water and invert them on a beehive shelf in a trough. Warm flasks to 30° C and fit each with a delivery tube leading into the gas jars. Observe changes after two intervals of 15 minutes.

Questions:

(a) Write balanced equations for the reactions observed.

(b) State the role of sugar/yeast in the reactions.

(c) Identify the property of yeast demonstrated.

Experiment II: Mix 2 g of baking soda with 3 ml of water in a test tube. Fit with a delivery tube leading to lime water. Heat gently and observe.

Questions:

(a) Explain the reaction occurring on heating.

(b) Write a balanced equation for the reaction.

(c) Discuss the importance of this reaction in baking.

3. You are provided with samples I, J, K, and L. Perform Experiments I–IV, record observations, and answer questions.

Experiment I: Add 2 ml of sample I to a test tube, add 3 drops of dilute hydrochloric acid, boil gently for a minute, cool, add 3 drops of dilute sodium hydroxide, then Benedict's solution. Shake and boil.

Question: Explain the basis of the observed changes.

Experiment II: Add 2 ml of sample J to a test tube, add equal volume of dilute sodium hydroxide, then 2–3 drops of 1% copper (II) sulphate. Mix thoroughly.

Question: Explain the observed changes.

Experiment III: Add 2 g of sample K to 5 ml of dilute hydrochloric acid. Filter, neutralize filtrate with ammonium hydroxide, then add 5% ammonium oxalate solution.

Question: Why was dilute hydrochloric acid added, and provide a balanced chemical equation.

Experiment IV: Dissolve 1 g of sample L in concentrated nitric acid, filter, add a few drops of 10% ammonium molybdate solution, and warm.

Question: Identify two plant foods that are good sources of the inferred component and explain why warming is necessary.