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: 2006**

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 sweet potato and a piece of chicken. Perform the experiment I and II by following the given procedures.

Experiment I: Place the slice of sweet potato on a hot pan and heat each side at high temperature (above 70° C) for 3 to 5 minutes. Record the observations on 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 other cooking methods that can produce similar characteristics in sweet potato.

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

Questions:

(a) Provide reasons for the changes in texture and aroma observed, highlighting differences from Experiment I.

(b) Explain how the texture of the chicken sample can be improved during processing.

2. You are provided with honey, fructose, baking powder, and yeast. Perform the following experiments:

Experiment I: Dissolve 10 g of honey in 50 ml of warm water in a flask and add 5 g of yeast. Repeat the procedure using fructose instead of honey. Fill two gas jars with tap water and place each upside-down on a beehive shelf in a trough of water. Warm the flasks to 30° C. Fit each flask with one end of a delivery tube and immerse the other end in the respective gas jars. Observe changes after two intervals of 15 minutes.

Questions:

(a) Write balanced chemical equations for the observed reactions.

(b) Describe the roles of sugar/fructose and yeast in these reactions.

(c) Give the property of yeast demonstrated in this experiment.

Experiment II: Mix 2 g of baking powder with 3 ml of water in a clean, dry test tube. Fit the test tube with one end of a delivery tube and immerse the other end in lime water in another test tube. Gently heat the mixture and observe.

Questions:

(a) Explain the reaction that occurred when heat was applied to the test tube containing baking powder.

(b) Write a balanced equation for the reaction.

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

3. You are provided with samples E, F, G, and H. Perform Experiments I to IV. Record observations and provide inferences.

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

Question: Explain the basis of the observed changes (two points).

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

Question: Explain the basis of the observed changes.

Experiment III: In a test tube containing 2 g of sample G, add 5 ml of dilute hydrochloric acid and mix thoroughly. Filter and neutralize the filtrate with ammonium hydroxide. Add equal volume of 5% ammonium oxalate solution to a portion of the filtrate.

Question: Explain why dilute hydrochloric acid was added to sample G and give a balanced chemical equation for the reaction.

Experiment IV: Dissolve 1 g of sample H in concentrated nitric acid. Filter and add a few drops of 10% ammonium molybdate solution to a portion of the filtrate. Warm gently.

Question: Name two plant foods that are the best sources of the component inferred from this experiment and explain why warming is necessary.