THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

155/2 **FOOD AND HUMAN NUTRITION 2**

(For Both School and Private Candidates)

Time : 3 Hours **ANSWERS** **Year : 2016**

Instructions

1. This paper consists of sections **A** and **B**.
2. Answer all questions in section **A** and only **two (2)** question from section **B**.
3. Non-programmable calculators may be used.
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 maize flour (sample Y) and reagents. Perform the following experiment:
   (i) Mix sample Y with water to make a thick paste. Spread a thin layer on a petri dish.
   (ii) Add 5 drops of iodine solution on one portion.
   (iii) Heat another portion at 120 °C for 15 minutes and repeat the iodine test.

   Questions
   (a) Record and explain the observations in steps (ii) and (iii).
   In step (ii), the sample turns blue-black, indicating starch. In step (iii), the colour changes to reddish-brown because starch was broken down to dextrins.

   (b) State the principle behind the iodine test.
   Iodine molecules fit into the helical structure of amylose in starch, forming a blue-black complex.

   (c) Explain the nutritional importance of the product formed in step (iii).
   Dextrins formed are more digestible than raw starch, providing a quick source of glucose and energy.

2. You are provided with raw egg yolk (sample Z). Carry out the following:
   (i) Place a drop of sample Z on a filter paper and leave for 5 minutes.
   (ii) Hold the filter paper against light and describe what you see.
   (iii) Place another 2 ml of sample Z in a test tube, add 2 ml of chloroform and 2 drops of Sudan III stain. Record observations.

   Questions
   (a) State what is demonstrated in step (i).
   The translucent spot on the filter paper demonstrates the presence of lipids.

   (b) Identify the nutrient tested in step (iii).
   Lipids are tested in step (iii).

   (c) Explain the principle of the Sudan III test.
   Sudan III is a fat-soluble dye that stains lipids red-orange, indicating their presence.

   (d) State two nutritional roles of this nutrient.
   Lipids provide energy. They also serve as carriers of fat-soluble vitamins.

3. You are provided with a mixture of baker's yeast, sugar solution, and lime water. Perform the following:
   (i) Add yeast to 50 ml of sugar solution in a conical flask. Fit the flask with a delivery tube into lime water.
   (ii) Leave for 15 minutes and record changes in the lime water.
   (iii) Compare the smell of the solution before and after 15 minutes.

Questions

(a) Identify the gas evolved in step (ii).

The gas evolved is carbon dioxide.

(b) Write a balanced equation for the reaction.

$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

(c) Explain the change in smell observed in step (iii).

The solution smells alcoholic due to the production of ethanol from fermentation.

(d) State the importance of this experiment in baking.

In baking, yeast fermentation produces carbon dioxide, which makes dough rise and gives bread a soft texture.