THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

155/1 FOOD AND HUMAN NUTRITION 1

(For Both School and Private Candidates)

Duration: 3 Hours **Year: 2025**

Instructions

1. This paper consists of **three (3)** questions
2. Answer **all** questions.
3. Question **one (1)** carries 20 marks and the others carry 15 marks each.
4. All writing must be in **black** or **blue** ink.
5. Communication devices and any unauthorised materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

1. **In Experiment I**

   Mix 1 g of each of the samples A, B, C and D with 6 cm^3 of water in separate test tubes then shake thoroughly. Leave the mixtures for 3 minutes.

   Question

   Briefly explain the changes observed after adding water to each sample in the given procedure.

   Experiment II

   (i) Put 2 cm^3 of a mixture of food sample A prepared in Experiment I into a test tube and then add 2 drops of iodine solution.

   (ii) Put 2 cm^3 of a mixture of food sample A into another test tube and then add equal volume of Benedict's solution then heat gently to boil.

   Questions

   (a) Record your observations and give explanations for each procedure.

   (b) Why was the mixture boiled after the addition of Benedict's solution?

   Experiment III

   (i) Put 2 cm^3 of a mixture of food sample **B** prepared in Experiment I into a test tube and then add equal volume of sodium hydroxide solution. Shake well then add 2 drops of 1% copper II sulphate solution.

   (ii) Put 2 cm^3 of a mixture of food sample **B** into another test tube then add equal volume of Benedict's solution and heat gently to boil.

   (iii) Put 2 cm^3 of a mixture of food sample **B** into another test tube thereafter, add 1 cm^3 of dilute hydrochloric acid and boil. Then, cool under tap water. Add 2 cm^3 of sodium hydroxide solution, shake the mixture well and add 2 cm^3 of Benedict's solution, heat gently to boil.

Questions

(a) Briefly explain what was observed in procedure (i).

(b) State the role of dilute hydrochloric acid and sodium hydroxide solution in procedure (iii).

(c) Briefly explain the importance of boiling and cooling the mixture after the addition of dilute hydrochloric acid in procedure (iii).

Experiment IV

(i) Put 2 cm^3 of a mixture of food sample **C** prepared in Experiment I into a test tube then add equal volume of Benedict's solution. Heat gently to boil.

(ii) Put 2 cm^3 of a mixture of food sample **C** into another test tube, boil the mixture then cool. Add 2 drops of iodine solution.

Questions

(a) Briefly explain the observations and inferences in experiment IV.

(b) Why was the mixture containing food sample C boiled and cooled before adding iodine?

Experiment V

Put 2 cm^3 of a mixture of food sample D prepared in Experiment I into a test tube then, add equal volume of sodium hydroxide solution followed by 2 drops of 1% copper II sulphate solution. Write your observation.

Question

What does Experiment V demonstrate?

2. You are provided with white wheat flour, sugar and baker's yeast. Perform the experiment by following the given procedures and answer the questions that follow.

Experiment I

Procedures:

(i) Heat 250 ml of tap water in a beaker to about 37 ^{o}C.

(ii) Pour 10 ml of water from procedure (i) into a plastic beaker. Dissolve 1 tea spoon of yeast followed by 2 tea spoons of sugar then mix using stirring rod. Leave the mixture to stand for ten minutes.

(iii) Sieve 250 g of white wheat flour into a small mixing bowl then add a pinch of salt.

(iv) Put the mixture obtained in procedure (ii) and the warm water prepared in procedure (i) into the mixing bowl containing 250 g of white wheat flour.

(v) Mix the contents quickly to form a soft dough which is elastic and pliable.

(vi) Knead the dough vigorously by hand.

(vii) Place the mixing bowl containing the dough into a bigger bowl that contains warm water about (25-30)^{o}C then cover the dough with a muslin cloth. After 30 minutes, observe the changes that take place.

Questions.

(a) State the types of raising agents that are demonstrated in this experiment.

(b) Briefly explain four methods that were involved in incorporating air into the flour mixture in the process of making dough in this experiment.

(c) What is the importance of procedure (vi) in making bread and buns?

(d) Briefly explain the next procedure to be followed in order to obtain the final product.

(e) Name and write the chemical equations of the processes taking place in the reactions demonstrated in procedure (ii) – (vii).

(f) Give one benefit of each end product obtained in this process.

3. You are provided with 80 ml of food sample **Y**, solution **Z**, a cooking pot or a sauce pan and a source of heat. Perform the experiment by following the given procedure and answer the questions that follow.

Experiment I

Procedure:

(i) Put 50 ml of sample **Y** in a sauce pan and heat it uncovered at high temperature (700^{O} C and above) until it boils. Continue heating for 5 minutes and remove it from the heat source. Observe and record changes in volume and appearance. Leave it to cool for 10 minutes and record your observations.

(ii) Take 5 ml of sample **Y** from the cooled sauce pan in procedure (i). Put it into a porcelain dish and heat to boil at high temperature (700 C and above) until it starts burning. Remove from the heat source and record your observation.

(iii) Put 10 ml of sample **Y** into a beaker and add equal volume of solution **Z**. Leave the mixture to stand for 5 minutes. Observe and record.

Questions

(a) Identify sample **Y**.

(b) Briefly explain the basis of the observed changes in procedures (i) and (ii).

(c) Name the reaction demonstrated in procedure (ii).

(d) Briefly explain what was observed when solution **Z** was added into the beaker containing sample **Y** in procedure (iii).

(e) Name the starter culture which is used to ferment sample **Y** and write the chemical reaction involved in this process.

(f) State the form of sugar that is present in sample Y.