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: 2011**

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).

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1. You are provided with food samples M, N and O. Perform the experiments I and II as follows:

   In Experiment I:

   (i) Place 2 g of sample M into a test tube and add 5 ml of iodine solution. Shake gently and record the changes.

   (ii) Crush sample N in a mortar, add a little water and filter. Take 2 ml of the filtrate and add 3 drops of iodine solution. Record your observations.

   (iii) Heat 5 ml of the filtrate of sample N to boiling and allow to cool. Add 1 ml of Benedict's solution and heat again for 3 minutes. Record your observations.

   In Experiment II:

   (iv) Place 2 g of sample O into a porcelain dish and heat strongly over a Bunsen flame. Record the observations made.

   Questions

   (a) Identify the food nutrients tested in Experiment I, steps (i), (ii) and (iii).

   (b) Explain the colour changes obtained in Experiment I.

   (c) State the principle behind the Benedict's test.

   (d) Identify the residue obtained in Experiment II and outline its properties.

   (e) Briefly explain the importance of tests performed in Experiment I in food quality control.

2. You are provided with fresh cow's milk, labelled sample P. Perform the experiments below:

   (i) Pour 10 ml of sample P into a test tube and add 5 ml of 10% acetic acid solution. Record observations.

   (ii) Filter the mixture in step (i) and wash the residue with distilled water. Dry the residue gently and describe its appearance.

   (iii) To 2 ml of the residue, add 1 ml of concentrated nitric acid. Boil gently, allow to cool and add excess ammonium hydroxide solution. Record the colour observed.

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Questions

(a) Identify the residue obtained in step (ii).

(b) Explain the scientific principle behind step (i).

(c) What does step (iii) demonstrate?

(d) State two industrial uses of the product identified in step (ii).

3. You are provided with cooking oil labelled sample Q and chemicals R, S, and T. Carry out the following experiment:

   (i) Measure 10 g of sample Q into a conical flask.

   (ii) Add 25 ml of solution R (ethanol) and 25 ml of solution S (ether). Shake thoroughly to dissolve.

   (iii) Add 1 ml of solution T (phenolphthalein) and titrate with 0.1 M KOH until a faint pink colour persists. Record titre values and repeat to obtain concordant readings.

Questions

(a) Calculate the saponification value of sample Q.

(b) State the significance of determining saponification value in oils and fats.

(c) Explain the role of shaking in step (ii).

(d) Outline one industrial importance of oils with high saponification values.

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