

2913/202
FOOD ANALYSIS AND
QUALITY ASSURANCE
Oct./Nov. 2022
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN FOOD SCIENCE AND PROCESSING TECHNOLOGY

MODULE II

FOOD ANALYSIS AND QUALITY ASSURANCE

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Non-programmable scientific calculator.

This paper consists of TWO sections: A and B.

Answer ALL the questions in section A and any TWO questions from section B in the answer booklet provided.

Each question in section A carries 15 marks while each question in section B carries 20 marks.

Maximum marks for each part of a question are as shown.

Candidates should answer the questions in English.

This paper consists of 3 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

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SECTION A (60 marks)

Answer ALL the questions in this section.

1. (a) State four functions of quality assurance department in a food industry. (4 marks)
- (b) Explain the scope of Codex Alimentarius. (4 marks)
- (c) The following data was obtained during the determination of iodine ($I = 126.9$) value of an oil. Calculate the iodine value of the oil. (7 marks)

Weight of sample analyzed = 0.526 g.

Volume of 0.1 M $\text{Na}_2\text{S}_2\text{O}_3$ required for sample = 27.2 ml.

Volume of 0.1 M $\text{Na}_2\text{S}_2\text{O}_3$ required for the blank = 59.6 ml.

2. (a) Write the following abbreviations in full as used in food analysis and quality assurance:
- (i) HACCP; (2 marks)
- (ii) FDA; (2 marks)
- (iii) KEBS. (2 marks)
- (b) Explain three factors which affect the quality of finished food products. (6 marks)
- (c) 4.4472 g of a sausage was heated at 500 °C for 6 hours to produce 0.0782 g of residue. Calculate the ash content of the sausage. (3 marks)

3. (a) State the analytical differences between crude fibre and dietary fibre. (6 marks)
- (b) Name four components of crude fibre in a food material. (4 marks)
- (c) Explain the importance of crude fibre analysis in foods. (5 marks)

4. (a) Explain three forms of water in a food system. (6 marks)

- (b) 350.08 g of maize was dried in an oven until it lost 19.6% of its weight. The dried sample was then ground into powder and subjected to moisture content determination. The following data was obtained.

Weight of dish = 23.54 g

Weight of dish + sample before drying = 27.30 g

Weight of dish + sample after drying = 26.10 g

Calculate the percentage total moisture content of the food sample. (9 marks)

SECTION B (40 marks)

Answer any TWO questions from this section.

5. (a) Define each of the following as used in sugar analysis:
- (i) polarization; (2 marks)
 - (ii) mutarotation; (2 marks)
 - (iii) specific rotation. (2 marks)
- (b) 30 g of jam was dissolved in water and the solution diluted to 100 ml. The optical rotation of this solution was measured in a 2 dm tube and found to be (+) 44 angular degrees. 50 ml of the original jam was inverted and made up to 100 ml. This solution had an optical rotation of (-) 2.6 angular degree in 2 dm tube. Calculate the percentage sucrose and invert sugar content of the jam given the following data: (14 marks)
- inversion divisor = 0.8825
 - specific rotation of sucrose = +66.5
 - specific rotation of invert sugar = - 20.2
6. (a) State five advantages of wet ashing. (5 marks)
- (b) 12 g of a food sample was incinerated at 500 °C to a residue of 7 g. The residue was boiled in distilled water and the mixture filtered through the ashless filter paper. The filter paper was ashed to a residue of 4 g at 500 °C. The filtrate, however, was titrated with 0.1 M HCl which required 16.5 ml to reach the end point. Calculate the:
- (i) percentage total ash content; (2 marks)
 - (ii) percentage soluble ash content; (3 marks)
 - (iii) alkalinity as percentage of Na_2CO_3 . (10 marks)
7. Explain the roles played by food industries in assuring the quality of marketed food products. (20 marks)
8. (a) State four properties of vitamin C that influence its method of determination. (4 marks)
- (b) Explain the principle of vitamin C determination by titration method. (6 marks)
- (c) An aliquot of 35 cm³ of 0.03 N NaOH solution was mixed with 55 cm³ of 0.01 N HCl and the mixture diluted to 200 cm³. Calculate the pH of the mixture. (10 marks)

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