2913/202
FOOD ANALYSIS AND
QUALITY ASSURANCE
June/July 2021
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.**

## SECTION A (60 marks)

*Answer ALL questions in this section.*

1. (a) Distinguish between process standard and product standard. (2 marks)

   (b) Explain each of the following classes of standards:

   (i) mandatory standards; (3 marks)

   (ii) voluntary standards; (3 marks)

   (c) Explain the role of Kenya Bureau of Standards (KEBS). (7 marks)

2. Explain each of the following features of a sampling plan:

   (a) sample size; (7 marks)

   (b) sample creation. (8 marks)

3. (a) Define pH. (2 marks)

   (b) (i) Define angular rotation. (2 marks)

   (ii) State five factors which affect angular rotation in food analysis. (5 marks)

   (c) During analysis of a sample of beans, the following data was recorded:

| | |
|---|---|
| weight of empty crucible | 20.8 g |
| weight of crucible plus sample | 26.8 g |
| weight of crucible after incineration | 21.6 g |

   Calculate the percent ash content of the beans stating the significance of the value. (6 marks)

4. (a) Analysis of a 0.306 g of cold pressed sunflower oil yielded the following:
   - volume of 0.12 M $Na_2S_2O_3$ required for sample = 16.3 $cm^3$
   - volume of 0.12 M $Na_2S_2O_3$ required for blank = 45.1 $cm^3$.

   Using the first principle approach, calculate the iodine value of the sunflower oil. (10 marks)

   (b) Explain the importance of determining the lipid content of foods $[S = 32,\ I = 126.9]$ (5 marks)

## SECTION B (40 marks)

*Answer any **TWO** questions from this section.*

5. (a) Discuss key trends that present food safety, opportunities and challenges in today's food industry. (14 marks)

(b) Describe food supply chain traceability as a trend in modern food industry. (6 marks)

6. (a) State **two** disadvantages of each of the following methods of moisture determination in foods:

(i) Drying methods; (2 marks)

(ii) Distillation methods; (2 marks)

(iii) Karl Fischer's titration method. (2 marks)

(b) Discuss the infra-red method for determination of moisture in foods. (5 marks)

(c) 250 g of fresh sukuma wiki vegetables was dried in hot air oven until it lost 82.5% of its weight, then ground into powder. The moisture content of the powder was analysed and the following data was obtained:

| | | |
|---|---|---|
| weight of empty dish | = | 68.52 g |
| weight of dish + powder | = | 72.38 g |
| weight of dish + dry powder | = | 70.89 g |

Calculate the percent moisture content of the fresh sukuma wiki vegetables. (9 marks)

7. (a) With the aid of a diagram, explain the PDCA cycle quality assurance as applied in food industry. (18 marks)

(b) Name two other tools that can be used in quality control in food industry. (2 marks)

8. (a) Describe copper reduction methods for the determination of sugars in food. (6 marks)

(b) Draw a labelled diagram describing the main component of a polarimeter. (6 marks)

(c) Outline the procedure for determination of each of the following:

(i) acid soluble ash; (4 marks)

(ii) alkalinity of ash. (4 marks)

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