

2913/304
FOOD ANALYSIS AND
INSTRUMENTATION
Oct./Nov. 2022
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN FOOD SCIENCE AND PROCESSING TECHNOLOGY

MODULE III

FOOD ANALYSIS AND INSTRUMENTATION

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 the questions in this section.

1. (a) Define each of the following terms as used in food analysis and instrumentation:
- (i) viscosity; (2 marks)
 - (ii) rheology. (2 marks)
- (b) Explain the application of rheology in food processing industry. (11 marks)
2. (a) Explain five conditions necessary for effective separation of components in chromatography. (10 marks) §
- (b) Using a labelled diagram, describe the working principle of a column chromatography. (5 marks) ¶
3. (a) Distinguish between flame photometry and atomic absorption photometry. (8 marks) ¶
- (b) Discuss the Weissenberg effect of viscometry. (7 marks) §
4. (a) Define each of the following terms as used in food analysis and instrumentation:
- (i) colorimetry; (2 marks) ~
 - (ii) densitometry. (2 marks) ~
- (b) Explain the functions of each part of a colorimeter. (11 marks)

SECTION B (40 marks)

Answer any TWO questions from this section.

5. Explain the working principle of each of the following techniques as applied in food analysis:
- (a) refractometry; (10 marks)
 - (b) polarimetry. (10 marks)

6. (a) State **four** factors which affect the rheological parameters of food materials. (4 marks)
- (b) With the aid of a graphical diagram, explain the classification of fluids based on rheology. (16 marks)
7. (a) Explain the function of each of the following parts of a polarimeter:
- (i) cell tube; (1 mark)
 - (ii) polarizer; (2 marks)
 - (iii) analyzer. (2 marks)
- (b) Name **five** types of refractometers used in the food industry. (5 marks)
- (c) Explain **five** applications of refractometry in the food industry. (10 marks)
8. (a) State **five** advantages of paper chromatography. (5 marks)
- (b) Outline the procedure for spotting food sample on thin layer chromatography plate. (7 marks)
- (c) State **eight** applications of high performance liquid chromatography in the food industry. (8 marks)

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