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.**

Turn ove

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: (2 marks)

    (i) viscosity; (2 marks)

    (ii) rheology.

    (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, describte 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: (2 marks)

    (i) colorimetry; (2 marks)

    (ii) densitometry.

    (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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