

2913/105
FOOD ENGINEERING I
Oct./Nov. 2021
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN FOOD SCIENCE AND PROCESSING TECHNOLOGY

MODULE I

FOOD ENGINEERING I

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) State **five** advantages of good food materials handling techniques. (5 marks)
- (b) Name the unit operations carried out to achieve disintegration of fibrous foods. (4 marks)
- (c) List **six** quality attributes commonly specified by food grading statements. (6 marks)
2. (a) List **one** item required in the first aid kit for each of the following injuries:
- (i) cuts; (1 mark)
 - (ii) topical contact with chemicals; (1 mark)
 - (iii) dislocation; (1 mark)
 - (iv) burns and scalds. (1 mark)
- (b) Describe the administration of first aid to a bleeding wound victim. (8 marks)
- (c) Identify **three** types of fire extinguishers that may be used in a food plant. (3 marks)
3. (a) Name **five** methods of cooling applicable in a food plant. (5 marks)
- (b) Identify **three** components of a cooling system that facilitate the extraction of heat from a food material. (3 marks)
- (c) Explain the methods of controlling scaling on the water side of a boiler. (7 marks)
4. (a) Name the types of possible contaminants in:
- (i) surface water sources; (6 marks)
 - (ii) ground water sources. (2 marks)
- (b) State the desirable attributes of a food plant floor. (7 marks)

SECTION B (40 marks)

Answer TWO questions from this section.

5. (a) Explain the use of equalisation basins in the treatment of liquid food industry wastes. (14 marks)
- (b) Describe a Pasveer oxidation ditch for the treatment of waste from cottage food factories. (6 marks)
6. (a) Describe the operation of a ball mill in size reduction of food material. (16 marks)
- (b) Write the equation for calculating the volumetric capacity of crushing rolls used in size reduction, identifying each term used. (4 marks)
7. (a) Discuss anionic surfactant used for cleaning in a food plant. (8 marks)
- (b) Explain the desired attributes of walls and ceilings in a food plant. (12 marks)
8. Explain the function of each of the following stages in water treatment for food plant use:
- (a) storage of raw water; (6 marks)
- (b) sedimentation; (4 marks)
- (c) aeration; (6 marks)
- (d) filtration. (4 marks)

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