

1903/104
FOOD ENGINEERING I
Oct./Nov. 2021
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**CRAFT CERTIFICATE IN FOOD PROCESSING AND PRESERVATION
TECHNOLOGY**

MODULE I

FOOD ENGINEERING I

3 hours

INSTRUCTIONS TO CANDIDATES

You should have an answer booklet for this examination.

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 4 marks while each question from 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. List **four** emergency facilities in a food processing plant. (4 marks)
2. Describe the electrostatic cleaning of dry food. (4 marks)
3. Explain the aeration stage in the treatment of underground water. (4 marks)
4. Name **four** principal structural components of a trickling filter for the treatment of food processing plant waste. (4 marks)
5. Describe the principle of operation of a plate coding system. (4 marks)
6. Identify the conventional safety colour codes for each of the following utilities in a food processing plant:
 - (a) fire protection; (1 mark)
 - (b) sprinklers; (1 mark)
 - (c) steam; (1 mark)
 - (d) drinking water pipe. (1 mark)
7. Name **four** criteria used for the classification of boilers. (4 marks)
8. List **four** refrigerants used for immersion cooling of food. (4 marks)
9. State **four** objectives of grading food materials by a processor. (4 marks)
10. Explain thermal conditioning of sludge from food processing plant waste. (4 marks)
11. Describe gravity thickening as a method of dewatering waste sludge from a food processing plant. (4 marks)
12. State **four** factors which affect the degree of cleaning of a surface using detergent. (4 marks)
13. List **four** general desirable properties required for detergents used for cleaning food processing plants. (4 marks)
14. State **four** advantages of steam sterilization of food plant surfaces. (4 marks)
15. Name **four** metallic materials used for the construction of food contact surfaces. (4 marks)

SECTION B (40 marks)

Answer any TWO questions from this section.

16. (a) State **ten** auxiliary structures and services required in a food processing plant site, in addition to the main processing buildings. (10 marks)
- (b) Explain **five** qualities required for materials used for construction of food processing plant equipment. (10 marks)
17. Explain **ten** considerations for hygienic design and construction of a processing equipment. (20 marks)
18. (a) Explain **five** quality requirements for disinfectants used in a food plant. (10 marks)
- (b) Describe amphoteric bactericides used as chemical disinfectants in food plants. (6 marks)
- (c) State **four** disadvantages of using iodophors as disinfectants in a food processing plant. (4 marks)
19. (a) Explain the **three** principal elements of control systems for automated materials handling operations. (9 marks)
- (b) Explain the use of sodium zeolite in the filter bed to remove permanent hardness of water. (4 marks)
- (c) Name the **two** steam accumulation techniques based on the operational pressure of the boiler. (2 marks)
- (d) Describe boiler blow down. (5 marks)

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