1903/104
FOOD ENGINEERING I
June/July 2020
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 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 **4** 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 from this section.*

1. State **four** benefits of efficient materials handling. (4 marks)

2. List **four** classes of water used in food and beverage industries. (4 marks)

3. Identify **four** methods of promoting aerobic decomposition of organic matter in wastewater. (4 marks)

4. Outline the procedure for cleaning food processing plants. (4 marks)

5. State **four** factors which determine the amount of chlorine used for disinfection of water. (4 marks)

6. Explain the hygiene consideration in the installation of pipes in the food processing plant. (4 marks)

7. List **four** characteristics of good wheels for trucks. (4 marks)

8. State **four** methods of controlling damage of raw materials during transportation and storage. (4 marks)

9. Explain the importance of thorough cleaning and rinsing of food contact surfaces before sterilization. (4 marks)

10. Name **eight** components of a first aid kit. (4 marks)

11. Define each of the following:

    (a) acceleration resistance; (2 marks)

    (b) grade resistance. (2 marks)

12. State **four** qualities of steam which make it ideal for use as a heating medium in food processing. (4 marks)

13. Explain **four** applications of cooling equipment in the food industry. (4 marks)

14. State **four** methods used in improving the effectiveness of wet cleaning of raw materials in the food industry. (4 marks)

15. Give **four** advantages of cleaning-in-place method as opposed to dismantling and cleaning. (4 marks)

SECTION B (40 marks)

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

16. (a) State **five** factors considered when choosing fuel for production of steam. (5 marks)

(b) Explain the quality requirements of boiler feed water. (6 marks)

(c) Describe the accessories used in achieving heat economy in the boiler. (9 marks)

17. (a) State **six** qualities of a good food contact surface. (6 marks)

(b) Explain the purpose of using chlorine in food processing plant hygiene. (6 marks)

(c) Discuss the use of trickling filters in the treatment of wastewater in the food industry. (8 marks)

18. (a) Name **five** classes of material handling equipment. (5 marks)

(b) State **six** unsafe conditions that can lead to accidents in the food industry. (6 marks)

(c) Explain the application of magnetic conveyors in the food industry. (4 marks)

(d) Differences between manual rollers and skate wheel conveyors. (5 marks)

19. (a) Explain each of the following methods of cleaning food raw materials:

(i) aspiration cleaning; (5 marks)
(ii) ultrasonic cleaning. (5 marks)

(b) (i) Define a cryogen. (2 marks)
(ii) State **four** properties of a good cryogen for use in food preservation. (4 marks)

(iii) State **four** main categories of industrial cooling systems. (4 marks)

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