1903/203
FOOD ENGINEERING II
June/July 2021
Time: 3 hours

2061252328

THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN FOOD PROCESSING AND PRESERVATION TECHNOLOGY

MODULE II

FOOD ENGINEERING II

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.

Turn over

SECTION A (60 marks)

*Answer **ALL** questions in this section.*

1. State **four** advantages of handling materials as unit loads. (4 marks)

2. Name **four** types of bulk elevators in the food industry. (4 marks)

3. Calculate the rate of heat transfer through the wall of an oven whose surface area and thickness are 2 m^2 and 5 cm respectively when the inner temperature is 180 °C and the room temperature is 20°C. The thermal conductivity of the material making the wall is 0.017 W/m.°C. (4 marks)

4. State **four** applications of impeller agitation in the food industry. (4 marks)

5. State **four** benefits of sorting food raw materials. (4 marks)

6. Differentiate between filtration and sedimentation processes. (4 marks)

7. Define each of the following:

   (a) filter aids; (2 marks)

   (b) filter medium. (2 marks)

8. State **four** areas of application of centrifugation in the food industry. (4 marks)

9. Name **four** types of materials used in packaging of food products. (4 marks)

10. State **four** advantages of adequate air circulation in the raw material storage rooms. (4 marks)

11. State **four** advantages of wet grinding of food raw materials. (4 marks)

12. Explain the use of drum driers in the food industry. (4 marks)

13. State **four** unsafe acts in the food processing plant. (4 marks)

14. Highlight **four** qualities of glass that make it popular for packaging some food products. (4 marks)

15. Using labelled diagrams, describe the basic types of emulsions formed from water and oil. (4 marks)

SECTION B (40 marks)

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

16. (a) Write the Stroke's law equation for the drag force defining each symbol. (5 marks)

(b) Explain centrifugal separation of milk. (6 marks)

(c) Describe each of the following methods of cleaning food raw materials:

(i) Aspiration cleaning. (5 marks)

(ii) Electronic cleaning. (4 marks)

17. (a) Define 'efficient materials handling'. (2 marks)

(b) Explain **six** factors considered in the design and operation of chutes. (12 marks)

(c) Explain the use of trucks in achieving high efficiency in the food processing plant. (6 marks)

18. (a) State **five** causes of variability in storage conditions inside a coldroom. (5 marks)

(b) State **five** benefits of packaging food. (5 marks)

(c) With the aid of a labelled diagram, explain the grinding of raw material in the food industry using a hammer mill. (10 marks)

19. (a) Name **four** major components of a spray drier. (4 marks)

(b) State **four** undesirable changes during drying of food materials. (4 marks)

(c) Explain **three** reasons for carrying out evaporation during food processing. (6 marks)

(d) Describe **three** methods of exhaustion of cans before their closure. (6 marks)

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