

1903/203  
FOOD ENGINEERING II  
Oct./Nov. 2021  
Time: 3 hours



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 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 the questions in this section.*

1. (a) Define manual conveyors used in a food processing plant. (2 marks)  
(b) Name **two** manual conveyers. (2 marks)
2. Explain the importance of safety considerations in a food processing plant. (4 marks)
3. State **four** ways through which a food plant operator can reduce product damage. (4 marks)
4. Explain contract purchasing method of materials acquisition for food processing. (4 marks)
5. Using a labelled diagram, describe double pipe heat exchanger. (4 marks)
6. State **four** hot air drying equipment used in food processing. (4 marks)
7. Explain how fermented tea is moved through a fluidized bed drier during drying. (4 marks)
8. Name **four** methods of food processing which employ indirect mode of heating. (4 marks)
9. Explain sedimentation in relation to stokes law. (4 marks)
10. State **four** objectives of size reduction in food processing plants. (4 marks)
11. Name the principle force and the equipment used during each of the following sugar processing operations.
  - (a) extraction of sugarcane juice from cane. (2 marks)
  - (b) separation of molasses from sugar crystals. (2 marks)
12. (a) Define reduction ratio. (2 marks)  
(b) Explain the significance of reduction ratio in milling. (2 marks)
13. State **four** qualities of a good food packaging material. (4 marks)
14. List **four** modes of operating size reduction plants. (4 marks)
15. Name **one** type of packaging used in each of the following foods:
  - (a) Biscuits; (1 mark)
  - (b) Fresh milk; (1 mark)
  - (c) Beer; (1 mark)
  - (d) Fresh sausages. (1 mark)

**SECTION B (40 marks)**

*Answer any TWO questions from this section.*

16. (a) Name **three** categories of trucks. (3 marks)
- (b) State **seven** qualities of wheels for trucks used in food processing plants. (7 marks)
- (c) Explain why freezing is classified as a heat transfer unit operation. (10 marks)
17. (a) 1.6 tonnes of sugar syrup with 72 % sugar content was produced by evaporating raw feed sugarcane juice with 14 % sugar content using a multiple-effect evaporator. Calculate the:
- (i) amount of raw sugarcane juice fed to the evaporator; (3 marks)
- (ii) amount of water evaporated from the raw sugarcane juice. (2 marks)
- (b) Explain dry method of cleaning food raw materials. (15 marks)
18. (a) List **four** methods used in food dehydration. (4 marks)
- (b) State **seven** factors which influence the suitability index of raw materials for processing. (8 marks)
- (c) Explain how each of the following factors affect the efficiency of a screening operation:
- (i) rate of feeding a screen; (3 marks)
- (ii) angle of inclination of screen; (3 marks)
- (iii) blinding of a screen. (2 marks)
19. (a) State **six** factors which affect the efficiency of spray washing of foods. (6 marks)
- (b) Explain each of the following methods of wet cleaning as used in food processing.
- (i) spray drum washer. (5 marks)
- (ii) spray belt washer. (3 marks)
- (c) With the aid of a labelled diagram, explain how a series consecutive drum screen operates. (6 marks)

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