

CHUKA



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RESITS/SPECIAL EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF
SCIENCE IN FOOD SCIENCE AND TECHNOLOGY**

FOST 232: FUNDAMENTALS OF FOOD SCIENCE ENGINEERING II

STREAMS: BSC FOST Y2S1

TIME: 2 HOURS

DAY/DATE: TUESDAY 29/8/2023

8.30 A.M. – 10.30 A.M.

SECTION A: ANSWER ALL QUESTIONS (30 MARKS)

1. (a) Explain the term mixing and classify types of mixers. (3 marks)
- (b) A bowl centrifuge is used to break an oil-in-water emulsion. Determine the radius of the neutral zone in order to position the feed pipe correctly. (Assume that the density of the continuous phase is 1000 kg m^{-3} and the density of the oil is 870 kg m^{-3} . The outlet radii from the centrifuge are 4 cm and 5 cm. (3 marks)
2. (a) Explain extrusion as a method of food processing. (4 marks)
- (b) Explain the factors which influence the time required for solvent extraction. (5 marks)
3. Differentiate between hammer mills and roller mills based on their mode of operation. (6 marks)
- 4 (a) Enumerate the main problems associated with using irradiation method of food processing and preservation. (4 marks)
- (b) Discuss the factors which influence the rate of heat penetration into a food during heat sterilization. (5 marks)

SECTION B: ANSWER ANY 2 QUESTIONS (40 MARKS)

5. (a) The movement imparted to a volume element of the fluid during mixing can be characterized by three velocity components. Use a diagram to illustrate and explain velocity components of mixing.

(6 marks)

(b) By use of examples discuss application of filtration in food processing. (8 marks)

(c) Explain deep filtration and categorize surface filtration processes. (6 marks)

6. (a) Describe specific advantages of extrusion cooking over other processes serving the same purpose. (10 marks)

(b) Explain centrifugation and give applications of mechanical centrifugation in the food industry. (10 marks)

7. (a) Explain the structural components of an evaporator and the important considerations in selection of an evaporator. (10 marks)

(b) Differentiate ball mills, hammer mills and roller mills based on their mode of operation. (10 marks)

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