

**CHUKA**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

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

**FOST 232: FUNDAMENTALS OF FOOD ENGINEERING II**

**STREAMS: BSC. FOST Y2S1**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 04/12/2018**

**2.30 P.M. – 4.30 P.M.**

**INSTRUCTIONS:**

- Answer ALL questions in section A and any other TWO questions in section B

**SECTION A**

1. Describe the role of a food engineer. (5 marks)
2. (a) Explain the benefits conferred by size reduction in food processing. (5 marks)  
(b) Name five main types of homogenisers and describe how they operate. (10 marks)
3. The energy required to reduce the size of solid foods can be calculated using Kick's law. State and explain Kick's law. (5 marks)
4. Explain the term mixing and classify types of mixers. (5 marks)

**SECTION B**

5. (a) 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  $1000 \text{ kg m}^{-3}$  and the density of the oil  $870 \text{ kg m}^{-3}$ . The outlet radii from the centrifuge are 3 cm and 4.5 cm. (5 marks)

- (b) Describe extrusion as a method of food processing and give reasons why it has gained in popularity. (15 marks)
6. (a) Describe the factors which influence the time required for solvent extraction. (10 marks)
- (b) Enumerate the main advantages and problems associated with using irradiation as a method of food processing and preservation. (10 marks)
7. (a) Describe
- (i) Ball mills
  - (ii) Hammer mills
  - (iii) Roller mills and explain how they work in size reduction of food. (10 marks)
- (b) Discuss the factors which influence the rate of heat penetration into a food during heat sterilization. (10 marks)
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