

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

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

FOST 232: FUNDAMENTALS OF FOOD PROCESSING ENGINEERING II

STREAMS:

TIME: 2 HOURS

DAY/DATE: TUESDAY 30/03/2021

8.30 A.M – 10.30 A.M

INSTRUCTIONS:

Answer all questions in section A and any two questions in section B

SECTION A

1. (a) State six important applications of size reduction in the food industry. [6 marks]
(b) Size reduction is a widespread, multipurpose operation. Explain six different objectives of size reduction. [6 marks]
2. Explain the following;
 - (i) Flow patterns in fluid mixing [3 marks]
 - (ii) Actions that may be taken in order to improve fluid mixing. [3 marks]
3. Explain the basic law of fluid flow through porous media. [4 marks]
4. The efficiency of expression depends on four key factors. Explain. [8 marks]

SECTION B

5. (a) Distinguish between two classes of extraction. Explain their mechanism of operation and give relevant food processing examples. [10 marks]
(b) Use a diagram to illustrate the basic structure of a single screw extruder. Describe the functions of the constituent elements. [10 marks]

6. (a) Notwithstanding their cost, centrifuges are used extensively in industry. Explain six applications of mechanical elements. [6 marks]
- (b) A bowl centrifuge is used to break an oil-in-water emulsion. Determine the radius of neutral zone in order to position the feed pipe correctly. (Assume that the density of the continuous phase is 1000kg m^{-3} and the density of the oil is 870kg m^{-3} . The outlet radii from the centrifuge are 3cm and 4.5cm. [4 marks]
- (c) (i) Explain the main differences between dielectric, ohmic and infrared energy with respect to how they heat food. [3 marks]
- (ii) List advantages of ohmic heating method of food processing. [7 marks]
7. (a) State the major disadvantages and the main problems faced by irradiation food processing method. [6 marks]
- (b) Discuss the factors which influence efficiency of expression process. [14 marks]
-