



UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

**B.Sc. ENVIRONMENTAL HEALTH SCIENCE AND
FOOD SCIENCE**

SEMESTER I

MAIN EXAMINATION PAPER -DECEMBER 2017

TITLE OF PAPER: FOOD PROCESSING

COURSE CODE: EHM323

DURATION: 2 HOURS

INSTRUCTIONS:

1. READ THE QUESTIONS CAREFULLY.
2. ANSWER ANY 4 QUESTIONS.
3. EACH QUESTION CARRIES 25 MARKS. WHERE A QUESTION IS SUBDIVIDED INTO PARTS, THE MARK FOR EACH PART IS SHOWN IN BRACKETS.
4. NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
5. WRITE NEATLY AND CLEARLY
6. BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

SPECIAL REQUIREMENTS: NONE

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

QUESTION 1

- a. Explain the difference between Newtonian and non-Newtonian fluids. [8 marks]
- b. Write Bernoulli's equation. [2 marks]
- c. State the factors summarised in Bernoulli's equation that influence the flow characteristics of a liquid in a pipe. [5]
- d. Milk and rape seed oil are flowing along pipelines of the same diameter (5cm) at 20°C and at the same flow velocity of 3m s⁻¹. Determine whether the flow is streamline or turbulent in each fluid. [Milk: $\mu=2.10 \times 10^{-3} \text{ N s m}^{-2}$, $\rho = 1030\text{kg m}^{-3}$; Rape seed oil: $\mu = 118 \times 10^{-3} \text{ N s m}^{-2}$, $\rho = 900 \text{ kg m}^{-3}$]. [10 marks]

[TOTAL: 25 MARKS]

QUESTION 2

- a. Use a diagram to illustrate the movement of moisture during drying of food. [10 marks]
- b. Discuss the mechanism of drying food under the following headings:
 - i. Constant rate period. [5 marks]
 - ii. Falling rate period. [10 marks]

[TOTAL: 25 MARKS]

QUESTION 3

Discuss thermal death of microorganisms under the following headings:

- i. Lethality (F_0). [10 marks]
- ii. D-value. [5 marks]
- iii. The z value. [5 marks]
- iv. Acid and low acid foods. [5 marks]

[TOTAL: 25 MARKS]

QUESTION 4

Write notes on the following:

- a. Heat film coefficient. [6 marks]
- b. Irradiation dose. [4 marks]
- c. Radappertisation. [5 marks]
- d. Radurisation. [5 marks]
- e. Reynolds' number. [5 marks]

[TOTAL: 25 MARKS]

QUESTION 5

- a. Discuss the concept of energy saving during food evaporation. [10 marks]
- b. Discuss the benefits of size reduction to food processing. [6 marks]
- c. Define blanching. [2 marks]
- d. Describe the conditions that are usually used to achieve desired sensory and textural effects of food during blanching. [7 marks]

[TOTAL: 25 MARKS]

END OF QUESTION PAPER