



**UNIVERSITY OF ESWATINI**  
**FACULTY OF HEALTH SCIENCES**

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

**SEMESTER I**

**MAIN EXAM**

**DECEMBER 2018**

**TITLE OF PAPER:** FOOD PROCESSING

**COURSE CODE:** EHS427

**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. Distinguish between direct and indirect heating during processing of food. [4 marks]
- b. Brief explain the changes that take place during of pasteurisation on food, e.g. milk. [3 marks]
- c. Sterilisation and UHT treatment of milk are considered equivalent heat treatment processes. Explain what this means. [6 marks]
- d. Heat treatment of fruits or vegetables can be done in a can be done in the container during the canning processes. Discuss the factors influencing heat penetration into the container. [12 marks]

**[Total: 25 marks]**

**QUESTION 2**

- a. Define the following terms:
  - i. Surface activity. [2]
  - ii. Bulk density. [2]
  - iii. Specific gravity. [2]
  - iv. D-value. [2]
  - v. Water activity. [2]
- b. State Kick's and Rittinger's Laws. [5]
- c. Briefly describe the benefits of size reduction in food processing. [5]
- d. Explain how moisture content of food affects size reduction. [5]

**[Total: 25 marks]**

**QUESTION 3**

- a. Name two sources of ionising radiation used in the food industry. [2 marks]
- b. Briefly explain the relationship between the wave and particle nature of radiation. [4 marks]
- c. Discuss the application of irradiation in food with respect to the dose used under the following headings:
  - i. Radappertisation. [5 marks]
  - ii. Radicidation. [5 marks]
  - iii. Radurisation. [5 marks]
  - iv. Inhibition of sprouting in potatoes. [4 marks]

**[Total: 25 marks]**

**QUESTION 4**

- a. The rate of heat transfer during food processing may be influenced by a number of factors. Name two of these. [2 marks]
- b. State the heat transfer mechanisms involved during blanching. [4 marks]
- c. In a bakery oven, combustion gases heat one side of a 2.5cm steel plate at 300°C and the temperature in the oven is 285°C. Assuming steady state conditions, and a thermal conductivity for steel of  $17 \text{ W m}^{-2} \text{ }^\circ\text{C}^{-1}$ , calculate the rate of heat transfer per  $\text{m}^2$  through the plate. [4 marks]
- d. Discuss the purpose of blanching and its effects on sensory and nutritional qualities of food. [15 marks]

[Total: 25 marks]

**QUESTION 5**

- a. Briefly explain the benefits of drying food. [5 marks]
- b. Define the following terms:
  - i. Dew point. [2 marks]
  - ii. Dry-bulb temperature. [2 marks]
- c. State the factors that determine the capacity of air to remove moisture from food. [6 marks]
- d. With aid of a diagram, discuss the mechanism of drying food using heated air. [10]

[Total: 25 marks]

**END OF QUESTION PAPER**