UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

B.Sc. ENVIRONMENTAL HEALTH SCIENCE

END OF SEMESTER I EXAMINATIONS

TITLE OF PAPER: FOOD PROCESSING

COURSE CODE: EHS507

DURATION: 2 HOURS

DATE: DECEMBER 2011

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. BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER

SPECIAL REQUIREMENTS: CALCULATOR

DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED TO DO SO BY THE INVIGILATOR.

QUESTION 1

a. Write notes on the following terms (Use illustrations where possible)

   i. Thermal death time [5]

   ii. Z-value [5]

   iii. D-value [5]

b. Discuss the factors that influence the heat resistance of microorganisms in food. [10]

[25]

QUESTION 2

a. It is desired to prepare a ready-to-drink orange juice containing 10% total solids. The initial pressed juice contains 50% of total solids. It will be mixed with a sugar solution containing 10% sugar. Use the Pearson Square to calculate the proportions of each of the orange juice and the sugar solution that must be mixed. [6]

b. If 100 litres of the drink have to be made, calculate the volumes of each of the components that will be needed. [4]

c. 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, given that $R_e = D\nu\rho/\mu$. [Milk: μ=2.10 x 10^{-3} N s m^{-2}, ρ = 1030kg m^{-3}; Rape seed oil: μ = 118 x 10^{-3} N s m^{-2}, ρ = 900 kg m^{-3}]. [8]

d. Explain how the flow properties may influence heat transfer in each case. [7]

[25]

QUESTION 3

a. State Kick's law. [2]

b. List the factors that influence the extent of size reduction. [4]

c. Distinguish between sorting and grading. [4]

d. Briefly explain the purpose and process of conditioning in the milling of wheat. [15]

[25]

QUESTION 4

a. Define irradiation dose. [2]

b. Briefly state the consumer concerns regarding use of irradiation in food. [3]

c. State five possible applications of irradiation in food processing. (5)

d. Explain the mechanism of preservation in the following processes:

   i. Drying. [5]

   ii. Fermentation. [5]

   iii. Chilling. [5]

[25]

QUESTION 5

a. Distinguish between pasteurization and sterilization. [5]

b. Under what circumstances is the use of preservatives in food justified? [10]

c. Discuss the concerns associated with using artificial sweeteners in food? [10]

[25]

THE END