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 2012

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 INTRUSCTED TO DO SO BY THE INVIGILATOR.

QUESTION 1

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]

[25]

QUESTION 2

a. Explain the differences between the following pairs of terms:

i. Streamline flow and turbulent flow of fluids. [5]

ii. Newtonian and non-Newtonian liquids. [5]

iii. Emulsion and foam. [5]

iv. Sorting and grading. [5]

b. Calculate the Reynolds number for each of water and glycerol flowing along a pipe of diameter 0.1m at the same average velocity of 1.0m s^{-1}. [$\mu_w = 10^{-3}$ kg m^{-1} s^{-1}; $\mu g = 1.47$ kg m^{-1} s^{-1}]. [5]

[25]

QUESTION 3

a. Use the Pearson Square to calculate the proportions of milk and cream needed to produce light cream containing 10% fat using homogenized milk (3.5% fat) and cream (20%. fat). [5]

b. Calculate the total mass balance and component mass balance for mixing ingredients to make 25kg of beef sausages having a fat content of 30%, using fresh beef meat and beef fat. Typically beef meat contains 18% protein, 12% fat and 68% water and beef fat contains 78% fat, 12% water and 5% protein. [10]

c. Briefly discuss the changes that take place during the extrusion of food. [10]

[25]

QUESTION 4

a. State the applications of irradiation treatment in food processing. [12]

b. Discuss the advantages, limitations and concerns over food irradiation. [13]

[25]

QUESTION 5

Use a diagram to illustrate the concept of thermal death time (TDT) and explain its uses. [5]

Compare and contrast direct heat treatment with indirect heat treatment. [10]

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

[25]

END OF EXAMINATION