UNIVERSITY OF ESWATINI
Faculty of Health Sciences
Department of Environmental Health Science

DEGREE IN ENVIRONMENTAL HEALTH AND FOOD SCIENCE

FINAL EXAMINATION PAPER 2019

TITLE OF PAPER	:	FOOD PROCESSING
COURSE CODE	:	EHS 427
DURATION	:	2 HOURS
MARKS	:	100
INSTRUCTIONS	:	READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
	:	ANSWER **ANY FOUR** QUESTIONS.
	:	EACH QUESTION **CARRIES 25** MARKS.
	:	WRITE NEATLY & CLEARLY
	:	
	:	BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

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

QUESTION ONE
(a) Define;
    (i)   Phase transition   **[1 Mark]**
    (ii)   Surface activity   **[1 Mark]**
    (iii)   Foams   **[1 Mark]**
    (iv)   Glass transition   **[1 Mark]**
    (v)   Newtonian liquids   **[1 Mark]**
(b) Discuss in details main objectives why we process food.   **[20 Marks]**
                                                Total [25 Marks]

QUESTION TWO
(a) Use Pearson Square approach to come up with the final composition of milk and cream, if you are given homogenized milk (3.5% fat) to be mixed with cream (20% fat) to produce a light cream containing 10% fat.   **[5 Marks]**
(b) Discuss the sequence of unit operation in Food Processing paying particular attention to any one product manufactured in Eswatini.   **[20 Marks]**
                                                Total [25 Marks]

QUESTION THREE
(a) What are main differences between Bernoulli's and Reynolds number principles?
                                              [7 Marks]
(b) Discuss the effects of variations in Reynolds number.   **[8 marks]**
(c) Two fluids, sucrose solution (20%) and milk are flowing along pipes of same diameter (4 cm) at 20°C and at the same flow velocity of 240 m/minute. Determine whether the flow is streamline or turbulent in each fluid. (Physical properties of sucrose and milk are as shown in Table 1).   **[10 marks]**

Table 1. Properties of Fluids

	Thermal conductivity $(W\ m^{-1o}K^{-1})$	Density $(kg\ m^{-3})$	Dynamic viscosity $(N\ s\ m^{-2})$	Temperature (^oC)
Sucrose (60%)			6.02×10^{-2}	20
Sucrose (20%)	0.54	1070	1.92×10^{-3}	20
Whole milk	0.56	1030	2.12×10^{-3}	20

                                              Total [25 Marks]

QUESTION FOUR
(a) Briefly discuss steady state versus unsteady state heat transfer.   **[15 Marks]**
(b.) What is wet cleaning?   **[5 Marks]**
(d) Briefly outline factors that influence the stability of emulsions.   **[5 Marks]**
                                              Total [25 marks]

QUESTION FIVE

(a) Define;
(i)	Homogenation	[1 Mark]
(ii)	Atomisation	[1 Mark]
(iii)	Z-value	[1 Mark]
(iv)	Phosphatase	[1 Mark]
(v)	Radiation	[1 Mark]

(b) Briefly outline the factors affecting the heat resistance of microorganisms in food.

[8 Marks]

(c) Discuss the application of extrusion in food processing.   [12 Marks]

Total [25 Marks]